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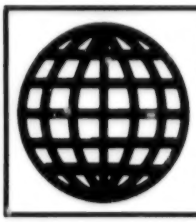

JPRS Report

Science & Technology

Europe

Economic Competitiveness

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SCIENCE & TECHNOLOGY POLICY

Greece: Research Status Described

92BR0222 Paris SCIENCES ET AVENIR in French Feb 92 pp 78-81

[Article by Dimitri Uzunidis: "Science in a State of Dependence"]

[Text] Despite its meager financial resources, the Greek state appears determined to support research. It now subsidizes up to 55 percent of private corporate research, finances the creation of combined corporate-university laboratories, and is embarking on a vast program for the creation of four science and technology centers. It also supports companies in the business sectors which are particularly well established in Greece: biotechnology, advanced materials, textiles, and ship-building.

Two questions arise straightaway, somewhat like the conundrum about the chicken or the egg. Is it the inadequate Greek resources in science and technology that this country is importing so much foreign technology, or is it rather this technological dependence which is frustrating the national research program at its inception? One thing is certain, Greece is all out of innovations. The competitiveness of Greek business has been deteriorating for a number of years, vis-a-vis both Europe and the newly industrialized countries (Taiwan, South Korea, etc.), because Greece has neither the financial nor the human resources to keep up with the technological progress led by the major industrialized countries. The main economic indicators for Greece are in the red; during 1990, the annual rate of inflation was 20.4 percent and unemployment reached 10 percent. The black market economy accounts for 30 to 35 percent of the gross national product (GNP). With respect to the economy, since 1989 Greece has been at the bottom of the list in Europe, having in fact been overtaken by Portugal. This situation has a strong impact on the development of science and technology.

As Professors Vaitsons and Giannitsis from the University of Athens explained, "In Greece, development of new technologies is admittedly weak, but there is no demand either." How could things be different, with more than 98 percent of Greek companies having at most 40 salaried employees who, in contrast to major industrialized countries, are unqualified, while they have to work with technology as outdated as it is rudimentary. Labor costs in Greece are 2.5 times higher than in the rest of the OECD's [Organization for Economic Cooperation and Development] member countries. Low productivity has led Greek manufacturers to specialize in bottom-of-the-line products for international trade (processing of agricultural products, raw materials, textiles, apparel, etc.). All of these companies purchase their equipment abroad; today, imported industrial equipment accounts for almost 60 percent of the total national investment in production machinery, as opposed to 46 percent in 1970.

This dependence which has increased as the years passed, is the natural consequence minimal investment. However, this is not the only cause; in reality, the question of innovation has to be related to the structure of Greek society as a whole. When specific scientific and technological advances are made, they are rejected by the social and economic structures. In this respect, the example of agriculture is interesting, since research in this sector receives priority treatment by the state. The discovery of new plant varieties (wheat and corn) and the implementation of new production methods (greenhouses, irrigation, etc.) have been blocked by the large-scale fragmentation of agricultural land and by EC agricultural policy emanating from Brussels, which will force Greece to eliminate half of these operations.

Greece needed a national coordinator for scientific and technical development. In 1982, realizing that business has never been interested in the problem, the government decided to assume this function. Under the aegis of the OECD and the EC, the Greek Government created the Ministry of Science and Technology, today called the General Secretariat for Research and Technology (GSRT). Its goal is to promote and strengthen the scientific and technological system of the country. Thus, the GSRT's task was to streamline the existing research operations, to create new ones, and to define a scientific and technological research policy for the country. In reality, the GSRT administers the major part of the industrial research budget and the EC resources destined for the improvement of the less-developed regions of Europe. Obviously, it supervises major research institutions such as the Center for Physical Science, the Research Center in Crete (mathematics, information sciences, and biotechnologies), and the National Research Institute (social sciences). In addition, most of the research institutions that have been created since 1982—such as the Institute of High-Temperature Chemical Engineering, the Institute of Chemical Processes Technology, and the Center for Renewable Energy Sources—were established on the initiative of the GSRT.

Despite its weak financial resources, the GSRT has decided to create synergies between laboratory research, experimental development, and mass production of new products thanks to the use of innovative production procedures. With this in mind, it subsidizes up to 55 percent of corporate research activities and finances the creation and operation of research laboratories by companies and universities. It hopes, thereby, to improve national industry competitiveness in the fields of biotechnology, new materials, textiles, and naval construction.

The universities make up the other major concentration of research in Greece; they handle more than one-third of all these activities. However, creation of laboratories for applied research is quite recent for them. The legal status of scientists, professors, researchers, and laboratory assistants has been specified; university laboratories can now employ personnel from outside the educational

system. They are now legally entitled to take part in national or EC research programs as an individual, without having to be employed by a university.

Greece is beginning to turn its attention toward training. It is about time, since everything begins there. In Greece only 3 percent of the 24- to 34-year-olds have a university diploma (24 percent in the United States, 11 percent in Germany). Moreover, Greece devotes less than 3 percent of its national income to education (7.5 percent in Sweden; approximately 4 percent in Portugal).

Where are the graduates going? About 12 percent of all Greek scientists work in industry, less than 1 percent in agriculture, and 87 percent in the service industries (basically the public sector and, more so in administration). Many high-level scientists received their degrees abroad; postgraduate university studies were indeed not instituted in this country with an eye toward improvement until 1985. However, taking the structural weaknesses of Greek industry into account, why such an effort? Some 4,000 researchers of Greek nationality are working in the United States and several hundred in Europe, for the most part in Great Britain, Germany, France, and Belgium. In 1985 the victory of the Andreas Papandreou-led Socialist Party inspired a number of Greek scientists working abroad to return to their homeland, more for political and ideological reasons than for financial ones. However, deterioration of the economic situation and the ensuing institution of an austerity program caused them to beat a hasty retreat.

Some 80 percent of researchers are concentrated in the public sector and in universities, with only 20 percent working in industry. Paradoxically, however, the majority are only interested in research from afar. This lack of interest is reflected by the fact that, according to EC figures, only 0.2 percent of the scientific publications referred to on a global level are of Greek origin; the subjects most often cited are in the mathematics, engineering, and agronomy. However, the transition from discovery to production is not an easy one. During 1989, research and development spending was only 0.46 percent of GNP, with 0.31 percent being funded by the government. Industry's share amounted to only 20 percent of the total, compared to about 50 percent in the major industrialized countries. An increasingly large amount of money allocated to research—i.e. more than 11 percent at the present—comes from EC programs, such as ESPRIT [European Strategic Program for Research and development in Information Technologies] (high-level technology) and BRITE [Basic Research in Industrial Technologies for Europe] (electronics). Companies taking part in research are rare, and those who do engage in it, do so only occasionally. In 1989, 210 companies reported to the GSRT that they had carried out research the previous year, yet only 68 responded affirmatively to the three surveys carried out by the GSRT since 1986.

But, why should we blame industry? What infrastructure does it have at its disposal to protect inventions or to access information? The National Information Center, a system for the collection and dissemination of scientific and technical information, exists only on paper. The Agency for Industrial Property, created in 1987 and intended to grant patents and register technology transfer agreements, is just beginning to operate. The Greek Agency for Small- and Medium-Sized Enterprises and Artisans, responsible to the Ministry of Industry, even though created more than 20 years ago, fulfills its function poorly. It is a ponderous, bureaucratic structure and its function (advice, technical assistance, and grants) is essentially limited to very small companies in traditional fields (ceramics, furniture, clothing, etc.).

Government markets for advanced technologies are very limited; the National Telecommunications Agency and the National Electricity Company prefer to buy their technologies abroad rather than to cultivate the national know-how.

Two types of businesses are involved more heavily in research than the others. First of all, the major public and private companies, which have the advantage of having historical ties with multinationals (through the purchase of license agreements); they are mainly operating in the metal construction, mining, plastics, and transportation industries. Second, there are the small enterprises, "very westernized" and very innovative, operating mainly in the information technology/microelectronics markets, biotechnologies, advanced materials, and alternative energy sources. The majority of these enterprises were set up by scientists who returned to their homeland and did not find work in the research centers, so they went into business, capitalizing on their high-level knowledge. These small companies consolidated their positions by participating in EC technology programs. On the whole, about 40 of them take part in these programs, alongside universities and national research centers.

Greece receives some 5 percent of the funds allocated by the EC within the framework of these programs. This is an enormous amount compared to other percentages: Greece represents only 0.6 percent of all researchers and 0.3 percent of EC research and development spending. A vast portion of the country's scientific and technical effort goes to nourish the large northern European companies which participate much more actively in the EC technology programs. This foments some sort of technology transfer from Greece toward companies from large industrialized countries, although the EC programs were set up to aid the less-favored regions of Europe.

In order to keep scientists at home and make sure that the available financial resources are used for innovation, the SGRT, in conjunction with the EC and the OECD, wants to develop science parks in order to foster research/industry contacts and to further the geographic decentralization of scientific projects; two-thirds of all research projects are concentrated in Athens. An ambitious program for the establishment of four science parks has been launched: in Athens, Salonika, Iraklion (Crete),

and Patras (Peleponnissos). The Democritus Center will be the masterpiece of the Athens science park, depository of acknowledged microelectronics know-how. As to the other three science parks, they will come under the aegis of research centers located in the host towns and managed by the GSRT, in cooperation with local universities. The project leaders of these last three parks, Messrs Ikonomou (Crete), Verikios (Patras), and Vassalos (Salonika), which are in fact the furthest along, are well-known university professors and actively engaged in research, maintaining close ties to European and American universities.

However, completion of these projects could be delayed since the financial resources granted by the EC cover a maximum of 70 percent of the total cost. The Greek Government has to supply the rest, which appears difficult in this period of budgetary austerity.

The future of research in Greece is not a bed of roses; the economy is sick. In the past two years, the austerity policy has stifled research; more and more, the EC is supplanting the national endeavor. Several public research organizations, the GSRT too, are on the road to privatization; and, already, a number of researchers have been dismissed. As a result of the austerity policy, some new projects will never come to fruition, and ongoing projects are being downscaled.

The GSRT is sounding the alarm itself: "The technological modernization of the country, a prerequisite for its survival, is now in an emergency situation since any delay will widen the gap between Greece and its EC partners at the moment when other counties in Southern Europe are in the process of converging with the wealthy economies in the EC."

Key Figures for Research

Domestic R&D Spending [DRDS] (1989 figures)		**FR1.8 billion**
DRDS/GNP Ratio (1989 figures)		0.46 percent
DRDS Funding Sources (1988 figures):	government	69.1 percent
	industry	19.2 percent
	foreign	11.6 percent
	others	0.1 percent
Number of researchers (full-time equivalent, 1989 figures)	5,400	
Researcher/total workforce ratio (1989 figures)	1 percent	
Share of Scientific Production in Europe [a] (1988 figures)	1.1 percent	
Patent registrations (1985 figures, percentage of EC total)	0.1 percent (up 21 percent since 1982)	

[a] Number of scientific publications signed by at least one researcher working in a Greek laboratory as opposed to total number of articles signed by EC researchers

[Caption]

Greek researchers are not being pampered and their prospects are not really gratifying. The resources which Greece devotes to scientific research are very meager: The 1.8 billion French francs (Fr) which Greece invested in 1989 in research and development represented only 0.46 percent of its GNP. Since 1986, the government and national companies have even reduced R&D funding as a result of the increased financing from abroad, essentially from the EC (technological programs, programs in support of less developed regions, etc.). Public research institutes (technopolies, universities) carry out 80 percent of all national research while the share of industry (public and private) has continued to decline (down from 29 to 23 percent) since 1986. Meager resources, companies devoid of technological aspirations, research which is essentially academic and university level, etc.: Greece shares its place at the bottom of the EC with Portugal. The lack of complete statistics on the purchase and sale of licenses is indicative of this country's backwardness with regard to the rest of the EC.

French Microelectronics Labs Seek Industry Links

92WS0390A Paris L'USINE NOUVELLE in French 20 Feb 92 pp 26, 27

[Article by Jean-Pierre Jolivet: "Microelectronics Research: Still Too Remote From Users"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Battles between institutions, doctrinal quarrels, inapplicable plans. The fact remains that French research centers do not sell enough licenses to industry. Is this solely a question of means? Japan spends 10 times as much as France on the development of semiconductors.

It is a hard fact. Over a period of 10 years, some 12 billion francs [Fr] have been injected into the research and development, and the industrialization of ICs [integrated circuits]. But the national champion, despite its link-up with Italy's SGS [General Semiconductor Company] in the joint venture SGS-Thomson, is still immersed in red ink. To the point that, to enable it to survive, the government is seeking to place it under the wing of the CEA [(French) Atomic Energy Commission]. This result raises numerous questions: What does French research in microelectronics actually produce? Does its public-sector nature, like its public-sector funding, not distance it from the reality of industry's needs? Has it put sufficient funding into developing the applications of its research? How effective is its research-industry linkage?

Many electronics manufacturers still remember Thomson's exemplary preference of U.S.-based General Electric's technology and patents for its liquid crystal display [LCD] screens, over those of CEA's LETI [Electronics, Technology, and Instrumentation Laboratory], a technology that Japan's Stanley is exploiting to this day after having acquired the patents. And the case of the technology of the micropoint fluorescent flat screens, whose industrialization was abandoned by Videocolor, and which are now packed in cartons at LETI. This situation is nudging LETI's officials now to cement contacts with Bull, Apple, and Hewlett-Packard in order to submit this micropoint technology to their expertise.

With the 1,200 persons employed by CNET [National Center for Telecommunications Research] and LETI (to which must be added the 800 or so development engineers at SGS-Thomson and Matra-MHS), and some 1.5 billion francs [Fr] annually for investments, French research in microelectronics can hardly rival that of its competitors in all aspects of the game. "This is a reality that French researchers and government officials have too often forgotten in the past. Considering our resources, priority niches should have been chosen," says a former member of EFCIS [Special-Purpose Integrated Circuits Design and Manufacturing] one of LETI's laboratories transferred to and integrated with Thomson when Thomson Semiconductors was created in 1983.

Japanese and Americans Bet Big

The three largest Japanese chip manufacturers alone spend more than Fr15 billion annually on research and development of semiconductors. And the big American firms devote 20 percent of their annual revenues, which often surpass Fr10 billion, to R&D, to which must be added the Defense Department program credits.

Nevertheless, more than 150 patents are awarded annually to the two principal French laboratories engaged in microelectronics research. What is lacking is a taker in industry. Some 300 of LETI's patents are being exploited by French companies in the microelectronics and optronics domains, ranging from the precision weight sensor used by Terraillon in its equipment, to the miniature accelerometer industrialized by Sextant Avionique, to the optoelectronic displacement sensor manufactured by the CSO company. "More than half the micron sensors marketed in France stem from LETI licenses," says Denis Randet, director of this laboratory.

Concurrently, more than 75 licenses have been granted by CNET to French and European firms—Matra-MHS, SGS-Thomson, Philips Components, Alcatel, X-Com—but also to American firms such as VLSI Technologies, with Texas Instruments and Austria's AMS currently showing interest. And 30 to 40 percent of the sales of SGS-Thomson's CMOS [complementary metal-oxide semiconductor] circuits stem from technologies developed in France.

In the extremely competitive environment of the sector, this does not suffice. "French microelectronics research still does not think sufficiently in terms of the needs of users. That, on the other hand, is where the strength of the Japanese and the Americans lies," says Jo Cornu, Alcatel NV's vice president in charge of technology for the group. What is true with respect to products is also true for manufacturing processes. Not so long ago, LETI was pursuing submicron research on 15 cm wafers, whereas productivity constraints today require diameters of 20 cm.

It is therefore not surprising that French microelectronics research—the technical level of which no one denies—might appear less effective than that of world leaders in the sector. The histories of the two Grenoble-based laboratories—LETI and the CNET's Norbert-Segard Center—have not facilitated the coordination of their efforts. The clash of two cultures—one issuing from the epic of the nuclear and the other from the saga of telecommunications—has sometimes bordered on doctrinal quarrels. The obstacle seems to have been surmounted since the creation of the GRESSI [Grenoble Submicron Silicon Initiative] GIE [economic interest group], which teams up CNET and LETI for the development of chips of the next generation. Faced by the seriousness of the situation, mentalities have evolved. For a year now, the CEA has been including marketing in its strategy for developing the applications of its research. "We are orienting our research on responses to the needs of the enterprises, while nevertheless devoting 15 percent of our funding to basic research, which prepares the long-term future," says Yannick d'Escatha, the CEA's director of advanced technologies. The CNET is also resorting to the marketing approach. It is no longer a question of launching a program for the development of ICs with neither a real commercial market nor an industrialization team to hand it over to.

The Developmental Imperative

This developmental outlook is also an imperative with respect to "technology-intensive" research, an area in which the Japanese are past masters. In France, despite successive "components plans," that is the area where the shoe pinches. "The problem with French microelectronics lies mainly at the level of the industrialization of its research," says Michel Chanac, head of development and marketing at CNET's Norbert-Segard Center.

For each Fr1 million spent on research upstream, Fr10 million must be devoted to its development, and up to Fr100 million to its industrialization.

LETI and CNET are already in the process of strengthening their ties with industry. In 1987, LETI transferred to the young company Sofradir (a subsidiary of SAT (telecommunications corporation), Thomson-CSF, and CEA) its infrared detection technology and its manufacturing process involving hybridization by means of indium balls. Three years later, it transferred its silicon-on-insulation [SOI] chips technology to Thomson's Military and Space Components Division. Recently, two former members of LETI, Jean-Pierre Lazzari and

Hubert Jouve, formed Silmag (together with Olivetti and venture-capital companies) to industrialize a magnetic heads technology enabling a tenfold increase in data handling capacity. Through the forming of GIEs such as Planecran (with Sagem in the domain of flat screens), CNET has embarked on the same road.

The French chips industry owes its survival today to the success of two large-scale operations around LETI and CNET. Under the GRESSI GIE—representing 80 persons—the two laboratories are working on the development of 0.35- and 0.25-micron CMOS's, which will be the semiconductors of the year 2000. Downstream, the team-up between CNET and SGS-Thomson on the Grenoble '92 program is expected to produce the rapid industrialization of the 0.5-micron CMOS technologies developed at the Norbert-Segard Center.

Will the entry of SGS-Thomson into the embrace of Thomson-CEA Industrie—should this merger finally materialize—facilitate the indispensable link between the world of research and that of industry? In this astonishing marriage between the nuclear on the one hand and washing machines and electronic chips on the other, the only real synergy is that between LETI and SGS-Thomson. However, by way of a rationale that is more political than industrial, the configuration being prepared by Jean Syrota, president of COGEMA [General Nuclear Materials Company] and of the future merger, excludes LETI, which remains a part of the CEA.

[Box p 26]:

A Potential of 2,000 Persons

In Microelectronics R & D

	Sites	Staff
CNET	Grenoble (Norbert-Segard Center)	32
CNET	Bagneux; Lannion; Rennes (CCETT)	60
LETI	Grenoble	820
SGS-Thomson	Grenoble; Rousset; Rennes; Tours	600
Matra-MHS	Nantes	180

Source: L'USINE NOUVELLE

[Box p 27, top]:

LETI: A Vast Field of Research

From nuclear medicine techniques, to magnetometry, to integrated optics on silicon: LETI possesses a broad range of activities. These are divided mainly among sensors and instrumentation (40 percent of its total activity); microelectronics (30 percent); and optronics (30 percent). The research done by 820 engineers and technicians at Grenoble and Saclay addresses the needs of clients in civil electronics (40 percent), nuclear activities (16 percent), and the health care, space, and defense sectors (34 percent). It has a budget of Fr625 million, 50 percent of which is financed by outside sources (contracts with industry and the Administration).

[Box p 27, bottom]:

CNET: France Telecom's Laboratory

The CNET's four principal microelectronics laboratories have a common objective: Master the technologies required by France Telecom. Silicon ICs at the Norbert-Segard Center in Grenoble, gallium-arsenide components for hyperfrequency equipment at the Bagneux Center, flat screens and optoelectronics at the Lannion Center, and signal-compression and HDTV techniques at the Rennes CCETT [Joint Center for the Study of Broadcast and Telecommunications], 380 engineers and technicians in all. Created in 1981, the Norbert-Segard Center has a second mission: Develop the silicon submicron line (technologies and manufacturing processes) that is to be used by the French and European semiconductor industries. This mission, together with the transfer of its 0.5-micron CMOS technology to SGS-Thomson under the Grenoble '92 program, is shaping the future of the French chip industry.

France: Key Points, Weaknesses of State Technology Policies

92WS0451A Duesseldorf HANDELSBLATT in German 1 Apr 92 p B15

[Article by Werner Osel: "Technical Progress Written in Capital Letters in Government Program"]

[Text] HANDELSBLATT-TL, 31 March 1992, Paris—He was heartbroken when in response to a questionnaire in Germany, Estee Lauder, an American company for fragrant facial creams and perfumes, was believed by most to be a French company.

To be sure, he has no objection to France being renowned for its quality of life, cuisine, and styles, but "we are at least as proud of our engineers and technology," the physicist, in SEP [Societe Europeenne des Propulsion] in Le Haillan near Bordeaux, said. In 1990, with 4,000 workers, SEP, established in 1969 by fusing the Society for the Study of Rocket Propulsion with SNECMA's rocket division, had a turnover of 4.6 billion French francs, of which only 25 percent involved military technology and 75 percent technology for civil purposes, chiefly propulsion for the Ariane rocket.

The Ariane, TGV—the high-speed railroad system, Mirage, Concorde, the Airbus, a state-of-the-art communications net, and 75 percent of the nation's power produced in nuclear power plants are all the results of an industrial policy, which, its initiators are convinced, is neither a planned economy nor copy of the Japanese MITI. The technicians have not done badly. The tax payers have paid for both successes and losses.

New Technologies are Strongly Supported

French Minister of Research Hubert Curien, a physicist with no party affiliation, can do more for the active advancement of new technologies than many of his colleagues in other countries. Besides his own 1991 budget of 26 billion French francs [Fr], the research minister coordinates and also presents to Parliament the budgets for research and technology of the other ministries, which total about the same as his own ministry's budget, namely, Fr9.5 billion for post, telecommunications, and space, Fr6.1 billion for the ministry of industries, Fr3.2 billion for land and sea transport, Fr2 billion for education, youth, and sport, and Fr1.8 billion for various other ministries, totalling Fr48.67 billion. In 1992, the total will be Fr51 billion.

In addition, there is the defense budget with its own funds and goals, which, however, also stimulates and utilizes civilian developments, and industrial expenditures, totaliing Fr150 billion. In the period from 1984 to 1991, France has gradually increased her expenditures for R&D from 2.21 percent to 2.45 percent of the Gross Social Product, and, in doing so, clearly leads the United States, although she still lags behind Germany and Japan.

The industrial R&D is concentrated in the large companies, which, in addition, are either entirely or partially state-owned. Only 2,650 of 90,000 companies with at least 10 employees in the service or production industries, as well as 50 industrial institutions and research facilities, carry out R&D on a continuing basis. Six percent, or 133 companies and organizations, furnish three-quarters of all French industrial R&D activities; they receive 90 percent of the government subsidies. Furthermore, the government must also make good losses suffered by Thomson, Bull, and Airbus.

To which Hubert Curien says: "We want to broaden the base. Two thousand and seventy-one companies and organizations, with fewer than 10 scientists, are already engaged in research. They represent 8.8 percent of the industrial R&D potential and receive 3 percent of all government assistance. In 1983, only 911 small companies were involved."

Since the 1960s, technical progress has been helped from the top down. The aim of the successive governments has been and continues to be to secure internationally strong positions in the five fields of civilian aviation, space, nuclear power, telecommunications, and electronics. In all these fields, cooperation has been sought and practiced, preferably with European and especially German companies and organizations. But that has brought difficulties, Hubert Curien complains, "because the guardian of competition in Brussels have proven to be disturbers of the peace." Precisely Siemens, with its technological and financial resources for high-flying, expensive projects in electronics and computers, which have cost so much and yielded so little, ought to be the ideal, well-heeled partner.

Paris is pleased with the developments in aviation, which are considered the showpiece of European cooperation. Airbus and the ATR, as well as the CFM56 engines, produced by SNECMA and General Motors, are export successes. These products employ composite materials, thermoplastics, aluminum-lithium alloys, fast propane engines, and better high-pressure compressors, combustion chambers, and turbines for large engines.

Engagement in Space

The space program has brought about the greatest synergies. Following the Ariane 4 booster rocket, which can carry a 4.3 t satellite, Ariane-5 is now under development. Telecommunications and information technologies from the ERS 1 satellites for earth reconnaissance, TV-SAT, TDF for television, ECS, Eurelsat, Marecs, Telecom for telecommunications, and Meteosat for weather observations have especially benefitted from the synergy effect. Nuclear power, which is jointly developed and operated by the CEA nuclear power authorities and the EDF monopoly, is another much prized field. Seventy-five percent of all electrical current is already being generated by nuclear reactors. The figure cited for current from the reactor is 6-7 cents per kilowatt hour. Industry, depending on individual usage contracts, pays 7-12 cents per kilowatt hour, while households pay 30 cents per kilowatt hour. Despite all the problems, France unalterably sticks with the fast breeder, which is considered "makeable" and "safe." Even if uranium waste should become more or less expensive to store with the passage of time, the fast breeder is considered cost-effective. It is expected that Germany will continue to share the costs.

Telecommunications has gained prestige because of the rapid modernization in the past 20 years of a system which had become completely obsolete. Further development continues on the Numeris "service-integrated" digital net, which will be compatible with the ISDN standard and which will integrate the telephone, teletype, and data nets, which remain separate to this day. Over 80 percent of all long-distance connections are already digitalized. By the year 2000, 36,400 kilometers of coaxial cable will be replaced by 17,000 kilometers of fiberglass cable.

Telecommunications in Digital Nets

Minitel, introduced by Telecom, has without doubt contributed to the popularization of data processing in France. Minitel replaces the printed telephone book with a small terminal, which has many other functions besides its use as a data bank for telephone numbers. Under development are the cellular telephone system and Eutel-tracs for making calls from aircraft.

Among the weak points, as before, is electronics, where Paris is concentrating on high-resolution HDTV or TVHD television, data processing, and electronic circuits, without achieving any real successes as in other

fields. France is looking for collaborators to find European solutions through the EUREKA and JESSI programs. With an initial Fr2.68 billion subsidy, Bull is starting up a project that will absorb a total of Fr14 billion, which has as its goal the increasingly common decentralized data processing with open systems.

Smaller Companies Left Somewhat Behind

Government programs also call for the automation of production. France participates in JESSI to the tune of Fr6 billion, yet Minister Curien warns against waste and strives to concentrate resources on specific main efforts.

Just as impressive as the good results of the targeted major projects are the weaknesses of the programs, especially the unsatisfactory participation of small and medium-sized companies. To be sure, small specialty manufacturers now circle the rocket plants in Bordeaux and Vernon as well as the Airbus center in Toulouse. While Telecom awards contracts to suppliers and the EDF thinks of itself more as a research promotor and test center for the power supply, even the most enthusiastic promotor of the large projects has to admit that many resources still lie fallow in the small companies.

A tax credit of 50 percent of costs for R&D, up to Fr40 million per company, should help. It was claimed by 7,717 companies (almost half with less than a yearly turnover of Fr100 million) in 1990. Companies with less than 2,000 employees can claim up to 50 percent, or a Fr200,000 subsidy, for taking on one scientist. In this way, the government hopes to increase the number of scientific positions by about 5 percent a year.

Two-thirds of the costs of the regional centers for technology transfer [CRITT] are assumed by the Ministry of Research and the regions. ANVAR, the Office for Innovation Promotion, which now has offices in 10 regions, awards subsidies for innovations. All of this is by way of additional financing, because no cutbacks are permitted in the major projects.

A broader base also means more engineers, physicists, and chemists, none of whom has an easy time getting into the French educational system. "We take 70 of the 3,500 candidates, because we simply do not have space for more," Jacques Lewiner, scientific director of the renowned Ecole Superieure de Physique et de Chimie Industrielles de la Ville de Paris [ESPC], confesses. However, most of the rejected candidates eventually gain entry to one of the other elite schools. "Furthermore, the elite schools will take 10 percent more students each year, since more engineers are needed for the government's ambitious program." And, of course, even the ESPC itself, which is the only Grande Ecole not under the jurisdiction of the government, but rather the city of Paris, will eventually honor the desires of the government.

France: Research Decentralization Plan Outlined

92WS0471C Paris AFP SCIENCES in French 26 Mar 92 pp 1, 2

[Unattributed article: "Research and the Regional Policy"]

[Text] Paris—More than one out of two researchers works in the Paris area. According to the minister of research and technology, Mr. Hubert Curien, this has to change because, as he pointed out to the ministers council on 25 March, "scientific research activities, and technology development and transfer are a basic lever in developing and modernizing regional economies."

In a communication on the operation "White Books," launched in 1990 to assess with precision the status of French research,[1], Mr. Curien said that regions could be divided into three main categories:

- "Research-rich" regions which make a precise and strict inventory of their capabilities. Aware of their attractiveness, they propose to offer sites to relocate Paris-area teams, "especially as regional authorities may easily help with the financing of new facilities."
- If regions have one or two well-focused research fields (which is the case of regions with an average number of research facilities), they often call for an endogenous or exogenous strengthening of the existing pole. This is more often the case when the scientific community is well structured. Local authorities are attracted by the visibility of the system and generally support such development. Additional development projects are also considered.
- "Research-poor" regions wishing to maintain or participate in a scientific life of high quality propose the development of inter-regional networks in which they might find a place. They also defend their specificity (insularity; rural areas with a strong identity) in order to obtain the relocation in their area of organizations working in specific fields.

From the analysis of the white books' contents, scientific experts at the Ministry of Research and the other ministries involved extracted several hundreds of projects, drawing up, so to say, a map of expectations.

Already last January, the government decided that 140 research teams now working in the Paris area would be relocated to the provinces during the next three years. Thus, 43 towns will benefit from the arrival of close to 2,600 researchers, engineers, and technicians. By the end of the decade, some 4,500 people will have moved to the provinces.

For instance, Mr. Curien went on, "a natural-resource pole is being set up in Orleans with teams from the INRA [National Agronomic Research Institute], the ORSTOM [Bureau of Overseas Scientific and Technical Research], the French Scientific Research Institute for Development in Cooperation, the BRGM [Bureau of Geological

and Mining Exploration], and the IFEN [French Environment Institute]. Brest's calling is in the field of marine sciences, Lille's has to do with transportation, and Clermont-Ferrand's with the agrifood sector. A mathematics institute is created in Toulouse to meet the needs of the aircraft industry.

In Ile-de-France, the minister of research further indicated, "research poles will be created preferably near the new universities: Evry, Marne-la-Vallee, Cergy-Pontoise, Versailles-Saint-Quentin." Some research laboratories located in the provinces will form inter-regional or European networks, so as to adapt themselves to international competition.

Before the end of the year, a group of experts will be asked to propose measures to boost the efforts of regional centers of innovation and technology transfer to small and mid-size industries. Finally, at the end of the year, a working group will submit to the government measures to encourage the decentralization of private research organizations, 60 percent of whose personnel are concentrated in the Paris area.

Here is the excerpt of the communique from the ministers' council concerning Mr. Curien's communication:

"About 52 percent of the personnel of public research organizations is concentrated in the Paris area.

"At the 29 January meeting of the interministerial committee on regional development, the government decided to set up in the provinces, during the next three years, 140 research teams currently working in the Paris area. Forty-three towns will thus benefit from the arrival of close to 2,600 researchers, engineers, and technicians. By 2000, 4,500 people will have moved to the provinces.

"This decision was made possible by the preliminary mobilization of the scientific community in each region, which led to the development of regional white books on research. Every public research organization prepared a prospective regional development plan.

"1) To implement this decision, local communities will be asked to sign an agreement with the State concerning the terms and rate of financing of the transfers.

"An accompanying social plan will enable the personnel willing to relocate to adapt to the consequences of their transfer. Specialized units, one in each of the main research organizations, will provide all the required information. A national job exchange will publish the list of available jobs for engineers, technicians, and management personnel.

"The responsibilities of the regional echelons of research organizations will be broadened as far as recruiting, management, and research project evaluation are concerned.

"2) The geographic redistribution of research must continue in the long term, especially as it relates to forthcoming operating contracts.

"The regional prefects have been instructed to consider new innovative regional projects.

"Some research laboratories located in the provinces will form inter-regional or European networks, so as to adapt themselves to international competition.

"In the Ile-de-France region, the location of research centers will be modified to follow the development of the new universities and achieve a more balanced distribution of research teams.

"The resources allocated to the regional delegates to research and technology will be increased. The composition of the regional consultative committees on research, and the procedure of reference to these committees will be revised to improve the committees' efficiency."

Footnotes

1. See AFP SCIENCES No 720, 7 June 1990 p 1, and No 798, 5 December 1991 p 1.

German Government Support for Industrial R&D Discussed

92WS0484A Duesseldorf VDI NACHRICHTEN in German 27 Mar 92 p 25

[Article by Martin Schneider: "The Cradle of New Products Is Often in the Ministry"]

[Text] ***At first glance, one doesn't see the "nursing" that preceded the exhibit of the impressive items displayed at the Hannover Fair. Often a good many German marks from the government's research budget had to be invested to nurture the development. It is not always easy to comprehend the structure and rationale of government support of applied research.***

VDI-N, Duesseldorf, 27 March 92

Research at the Hannover Fair? Most visitors to the world's largest industrial fair accidently find themselves in Hall 18, where the universities and other research facilities present themselves as the "cradle" of what is to be seen in the surrounding halls. No new development without previous research—a truism. Even more interesting is the question of who finances (or should finance) applied research. It was a simple matter in the former GDR, since both research and industry had to serve the welfare of the State equally. Many institutes of the Academy of Sciences as well as of the universities see therefore nothing more than affiliate research departments of the neighboring combines.

In that kind of system it was not important where basic research stopped and applied research began, and where the latter once again became a specific development. That question is much more important for the promotion of R&D [FuE] in the "capitalist West." According to the rules of a pure market economy, the costs for a new development are primarily the responsibility of the

industry, which eventually will profit from it. Minister of Research Riesenhuber expresses his views on the matter in the following way: "Research and development are the responsibility of the particular companies and must therefore, in our understanding of how research is to be promoted, be supported primarily by funding from the companies involved. After all, it is the companies who best know where funding for research will be most profitable and how to assert themselves in international competition." The minister likes to refer to the fact that under his patronage R&D expenditures have almost doubled. Of the 70 billion German marks [DM] spent annually in the German Federal Republic on R&D, the economic sector participates in more than 60 percent of the effort. "Subsidization," is however the magic word that makes it possible for the companies to gain access to government funds for the promotion of research. The Federal Ministry for Research and Development [BMFT] recognizes that, according to the principle "providing help in order that the individual can help himself," government furtherance of economic research can be justified in cases where, because of overriding societal and macroeconomic considerations, research and development requires government support."

This "charitable" mission derives from the general principles laid down for government support of research. The BMFT opens its cornucopia for the following fields:

—Cross-program basic research;

—Long-term government programs;

—Support of technology and innovations.

It is especially under the third case that various companies come to receive government financial support for research.

Whoever has a chance to get a piece of the support pie must first take a course on BMFT financial support procedures. The standard procedure is "direct project support." Within the framework of direct project support, which is essentially open to applicants from all sectors—the economy, universities, research institutes—advanced technologies of the future are to be considered and developed.

For the economic sector, the fields of power, biotechnology, information technologies, marine engineering, materials research, as well as transportation and aviation research are wide open. The BMFT particularly welcomes joint applications from companies and research institutes ("Joint Research") working together.

Joint Research in Favor

In 1989, 15.5 percent of the entire BMFT budget—DM1.2 billion—went into direct project support alone. More than half of that amount went via joint research projects.

Strictly speaking, the participation of German companies in projects associated with the European EUREKA program also come under this procedure. In his recently released "Memorandum on Research Policy," Heinz Riesenhuber called for a "concentration on precompetitive applications-oriented research" for the European research policy.

In order to ensure swift acceptance for newly developed key technologies, ministry officials have devised the "indirect-specific support" process. In this process, programs from the fields of biotechnology, production engineering, power research, and information technology, which will facilitate access to new technologies to mostly small and medium-sized companies and help to ensure their rapid acceptance, are promoted.

The first program was—in its time—intended to help publicize "microelectronics applications." In the 1980s, about 1,800 companies participated in this program; open for applicants at this time are programs in bioprocess technology and "CIM in the new States." In this case, the companies need not be plagued with complicated applications. Most of the costs, with a maximum set at about DM400,000, are paid in a lump sum.

The reason for the involvement of the federal government in the pristine terrain of the private economy is clear. Government financial support is deemed necessary to frighten off the threatening specter of technological backwardness in German industry. In the real world, the menacing specter is most often garbed in a white robe decorated with a large red rising sun. Japan's predominance in microelectronics threatens to become even greater. The Europeans want in EUREKA to accomplish what JESSI was intended to do. That program, established three years ago to catch up with Japan, is now suffering from financial shortness of breath. And the fact that IBM and Siemens acting alone produced the only recent success in European microelectronics, namely, the prototype of a 64-megabit memory chip, also does not speak well for the success of the program. It is difficult to avoid "irritations," when the government and the economy meet at cross purposes.

The Ministry of Research is responsible for only half the total government outlays for R&D, which in 1990 amounted to DM24 billion.

Almost one-fourth of the R&D outlays come from the defense budget, the remainder is controlled chiefly by the ministries for economics, education, and science. The funds from Moellemann's ministry mostly go to the Association of Industrial Research Establishments, which uses those funds and other resources from industry to pay for industrial association research.

Besides its direct R&D financial support in the economy, the government is also involved in the broad field of applied research, which precedes all market-directed developments. The clearest example of this is the Fraunhofer institutes, whose financing system ensures that the researchers rarely need to get lost in the morass of pure basic research. The institutes are obliged to raise 70 percent of their own funding, usually from the industrial

sector. When they have done that, then the BMFT contributes its part. Even the major research facilities are—to a great extent—occupied with applied research. The "Blue List" institutes too, which are jointly financed by the federal government and the States, likewise have many projects directed to applications.

Nor does "pure" science even reign in the halls of the German Research Association [DFG], which is the organization really responsible for basic research in the universities. Undoubtedly, there is a field of "pure" research, which is driven solely by the Faustian striving to learn what holds the Earth together in its innermost core. But in our technological society it is difficult to delineate sharply just where basic science leaves off and applications begin. At least, that is what four special research facilities studying hypersonic technology, financed by special funds from the BMFT, believe. To be sure, no specific aircraft is being built in those facilities, so that theoretically it should be clearly a matter of basic research. Should a hypersonic spacecraft ever be realized, MBB armaments companies, which belong to Deutsche Aerospace, would build it. Consequently, the Munich company does not even refrain from advertising the planned Saenger spacecraft and the four DFG special research facilities in its glossy company prospectus.

Even when the cry for "more government" gets louder and louder, when German industry is lagging in one field or another, our new, greater Germany increases the responsibility and even obligation of industry to maintain—by its own means—its position in the international technological race. Those who just build houses and roads, can simply invest less in high tech.

EC, Bonn Polarized on High-Tech Industrial Policy

92WS0494C Duesseldorf VDI NACHRICHTEN in German 13 Mar 92 p 4

[Article by Thomas A. Friedrich: "Bonn and Brussels on Collision Course: EC Industrial Policy Continues to Provide for Conflicts: EC Commissioner Filippo Pandolfi Reproaches German Federal Minister for Research & Technology Heinz Riesenhuber for JESSI Confusion"; first paragraph is VDI NACHRICHTEN introduction]

[Text] Brussels, 13 Mar—The German position on Europe's research policy is scarcely meeting with approval in Brussels. Federal Minister for Research and Technology Heinz Riesenhuber's appeal to EC Commissioner Filippo Pandolfi for more funding for the EC microelectronics project JESSI [Joint European Submicron Silicon Initiative] has fallen on deaf ears. There is a deep chasm between Bonn and the EC metropolis on the issue of a Eurochip factory.

When the door to Federal Minister for Research and Technology Riesenhuber's official limousine opened in front of the Breydel House—the alternative to the asbestos-tainted Berlaymont building—the minister from Bonn was greeted by a new atmosphere in the only-recently occupied EC Commission building. Over the course of the two-and-a-half-hour meeting with his host, Pandolfi, however, it quickly became clear to him that the new surroundings have done nothing to change the old spirit of the Brussels EC Commission.

Although both politicians affirmed the common goal of wanting to improve the competitiveness of the European economy, Pandolfi and Riesenhuber are clearly at odds over the best way to achieve this, especially in the key area of information and communication technology (I&C).

While the German Government is calling for a "much stronger commitment" by the EC Commission to EUREKA [European Research Coordinating Agency] projects, EC representatives see mostly "confusion instead of cooperation" in the microelectronics project JESSI, according to one of Pandolfi's close associates.

Responding to Riesenhuber's objection that the Maastricht resolutions require that "spreading the EC research programs too thin be avoided," Pandolfi countered with fundamental criticism of the previous JESSI concept. Every three months JESSI is served up under a different label in Brussels, the EC commissioner told his German guest. For example, since the IBM-Siemens coproduction agreement, the former 64-megabit project has been split up into more than 200 individual projects, and he only learned of the latest "flagship" initiative for JESSI "second-hand."

The discussion on this point became "somewhat delicate," according to one participant in the meeting. And before more money from the EC coffers can go into the self-assertion of the European microelectronics industry, Pandolfi told Riesenhuber, he reserves the right to carry out "a thorough examination" of the proposed projects.

Pandolfi's criticism of the organization and concept of the JESSI project, which is shared by his close associates, such as ESPRIT [European Strategic Programs for Research and Development in Information Technology] chief Jean Marie Cadiou, could quite possibly be sustained by the industrial policy objectives of the EC Commission, which are being expressed with increasing clarity.

Because through the new proposals for European industrial policy in the draft treaty of Maastricht, the French in particular hope to set up a Community policy in the areas of space travel and I&C that is more dirigible than has been the case in the past.

Thus, application-oriented programs in the sectors of information and telecommunication as well as industrial material technologies and reproductive raw materials should make up only 60 percent of the medium-term overall spending in the future fourth framework program for EC research support. In so doing, the I&C area should be cut back from nearly 40 percent at present to around 34 percent.

Using in part the funding that is freed up in this way, the Francophile industry lobby in Brussels would like to subsidize a European factory for the 64-megabit chip under the guise of European basic research.

This is rejected by Riesenhuber based on industrial policy considerations. If there is interest in this sort of factory, then industry, and not the public sector, should advance the money. On the other hand, such funding would then be withdrawn from basic research in Europe.

At present, there continues to be a Babel of languages in Brussels and in the capitals of the European Community concerning the buzzword "industrial policy." "The formulations found thus far are very much open to interpretation," according to the economic policy spokesman for the FDP [Free Democratic Party] in the European Parliament, Ruediger von Wechmar. He is completely unclear on whether the Maastricht treaties mean that "regulatory and competitive policy will continue to play a fundamental role" in the European Community in the future.

Wechmar's liberal party colleague and EC Commissioner Martin Bangemann has already overcome the German fears of contact with regard to the concept of industrial policy. He recently made fun of the fundamental German position in an interview with DIE ZEIT. "They are preserving the illusion of 'we are market economists, and industrial policy is something very dirty.'" At the same time, he continued, everyone knows that an interventionist policy is in effect for the coal industry, for the shipyards, and for other institutions. In reality, industrial policy, some of which is bad, interventionist, and subsidy-oriented, is being generated thick and fast, the former German minister for economics said in denouncing Bonn's position.

In the struggle for future markets in information and communication technology, the Siemens electronics concern is now unwilling to continue its bullish attitude with the "ballast" of German positions in Brussels. Although there is still no response to the written proposal by Siemens Board Chairman Karlheinz Kaske to EC Commissioner Pandolfi concerning investment in a European chip factory costing "several hundred million dollars" from EC coffers, an answer has already been drafted, according to sources in Brussels.

And the electronics giant in Munich, together with the Daimler-Benz concern, is currently putting out feelers on the possibility of going straight to Brussels with aid applications, thus circumventing the Ministry for Research and Technology in Bonn entirely.

French Telecommunications Research Network Inaugurated

92WS0540A Chichester INTERNATIONAL TELECOMMUNICATIONS INTELLIGENCE in English 30 Mar 92 p 1

[Text] The inauguration was recently carried out of a research network in Ile de France at the Paris Jussleu University. The network is the result of a partnership agreement signed last July between France Telecom and the Ile de France Regional Council.

Operating at speeds up to 34 Mbit/s, the Ile de France Research network offers efficient low-cost interconnections of local networks over great distances. The network is also integrated into the national telecommunications network for research (Renater) with the aim to federate all regional networks on the move within national territory.

So far, seven sites have been connected. Two of the seven, the Laboratoire d'Oceanograph le Dynamique et de Climatologie (LODYC) and the Laboratoire de Physique Theorique des Liquides (LPTL), on the Jussleu campus, have used the network for research during its pilot phase.

According to France Telecom, future plans include the connection of the network to telecommunications networks for research abroad, particularly in the EEC countries and in the United States.

France Telecom has also installed a 34 Mbit/s connection between the Saclay CEA and the research network. This is a European first, said France Telecom, as Ethernet, Token Ring and FDDI networks have never been connected at such a high rate.

Funding for the project, totaling some Fr60 million, was supplied by the Ile de France Regional Council.

Post-Maastricht Objectives for EC R&D Reviewed

92WS0541B London INTERFACE EUROPE in English Apr 92 p 5

[Text] With the support of Jacques Delors, EC Commissioner for Research Filippo Pandolfi, will be asking for an increase in annual research expenditure, from its present ECU2.4 billion to ECU4.5 billion in 1997—nearly twice its present level.

This news was given by Charles White, a spokesman for the Commission's Directorate General for Science, Research and Development (DG XII), at a conference organised in London on April 3 by the Institute of European Trade and Technology (IETT).

Mr. White stressed that the Commission as a whole had yet to endorse this proposal. While it is likely to do so, the final decision will depend on the Council of Ministers and the European Parliament.

Without losing sight of the needs of basic scientific research, the Commission wants the focus of EC R&D to shift nearer to the market, with a move towards "pre-commercial" rather than "pre-competitive" research. Mr. Pandolfi believes that this will not infringe the principal of fair competition in the world market because of the heavy social costs European industry has to carry, and the openness of the European market compared to other markets.

There will be a new emphasis on making sure that national RTD policy and EC policy are mutually consistent, as well as on more cooperation with the countries of Central and Eastern Europe (CEE).

The Community's post-Maastricht agenda will require increased research for example in connection with the development of trans-European communications networks and public health. Since it currently takes four to five years to incorporate new scientific ideas into an EC research Framework Programme, ways must be found to streamline the procedure, in Mr. Pandolfi's view.

With this in mind, Mr. Pandolfi wants to introduce a number of "Technical Priority Programmes" (TPPs). These would focus on key multidisciplinary "targeted projects" such as the development of environmentally friendly vehicles, the Europeanisation of railways, the "Euroship," clean manufacturing, customer-based and environmentally-based construction and technically advanced distribution. It is also appropriate, Mr. Pandolfi thinks, for EC R&D to tackle "big science" tasks such as fusion research, human genome, global change, and the preservation of the ozone layer.

Human Capital and Mobility Programme

Mr. Pandolfi also wants to give increased priority to fostering the European Science Community. This will be done largely through the Human Capital and Mobility Programme (successor to the old SCIENCE and "Stimulation" programmes). As reported in detail in our last issue the Council has agreed a "common position" (CP) on this programme which should be finalised shortly.

Mr. White said that the work plan should be agreed upon by the end of April and a call for proposals is likely to follow very shortly after that, with a likely deadline for applications by institutions at the end of June. Additional finance seems likely to be forthcoming in order to facilitate the participation of the CEE in the programme, he added.

CORPORATE STRATEGIES

Nokia Data Produces New PC Line Under ICL

92BR0278 Amsterdam COMPUTABLE in Dutch 13 Mar 92 p 7

[Article by Roel Mazure: "New Line of PC's To Push ICL to European Top"]

[Text] London—In fewer than five months, ICL's takeover of Nokia Data has resulted in a new line of PCs. A lot of attention was paid to the ergonomic aspect of the machines. N. Eadie, president of ICL Europe, said that the company has set its sights on the European top position, which is currently still being held by IBM.

ICL calls its new PC line the '92 Collection, as if it were the spring presentation from a French couturier. It is a series of 13 new PCs and a large number of software products. The line was developed and manufactured by the new Personal Systems division, which was created following the takeover of Nokia Data by ICL last October. "The fact that this line of products could be developed in five months and three days proves that the takeover hardly caused any problems," said David Mills, director of the new division.

At the product level, Nokia Data and ICL complement each other very well. The Finnish Nokia concentrates mainly on PCs and terminals while the core business of the British ICL is mainframes and midrange machines. The two firms also fit together geographically. Nokia is strongly represented in Scandinavia and Germany while ICL plays a major role in homeland Britain as well as in the Netherlands and Italy.

ICL had a good year, despite the recognized worsening market conditions. PC sales grew by 36 percent, representing an increase in revenues of 26 percent. Combined sales following the merger of ICL and Nokia Data were also very good. In the last quarter of 1991, 45,000 PCs were sold.

According to Dataquest figures, ICL ranks eighth on the list of European PC suppliers in 1991, with a market share of 1.7 percent, which corresponds to 143,000 units sold. The company is not hiding its intention to reach the number-one position—an ambitious objective in the light of IBM's European market share of nearly 14 percent. When asked how much time it would take to reach this top position, Eadie disavowed the Japanese way of thinking of Fujitsu, which owns 80 percent of ICL. "That is irrelevant," he said, but later on, he gave a hint by adding "for the time being, we are aiming at the end of the decennium."

Ergonomics

The ergonomics of ICL's systems is one aspect which is to push the company rapidly to the top of the list. This may be considered as a legacy from the Finnish Nokia Data. Traditionally, the Scandinavian countries put more emphasis on working conditions than other countries. However, factors such as radiation, keyboard design, ventilator noise, and screen flickering are considered important in Germany, too. ICL is anticipating the announcement this year of European guidelines in this area. "Our screen technology is based on stringent Swedish requirements," said Mills. This concerns the radiation level and refresh rate—the speed at which the image is refreshed on the screen—of the monitor. "This is not just a detail," claims Mills. "A high refresh rate prevents undesired screen flickering, which can cause headaches in case of lengthy use." The use of graphic-user interfaces with many active windows indeed requires a high refresh rate.

According to Mills, ICL has achieved a significant lead on its 10 foremost European competitors in the field of ergonomics. "We have already been approached by companies who want to acquire our technologies." Serious negotiations are being held in this respect with

major PC manufacturers regarding OEM [original equipment manufacturer] contracts for producing ICL PCs. Neither Mills nor Eadie would reveal which manufacturers were involved. Mills mentioned that one of the top-10 suppliers was involved.

This year, ICL will be paying more attention to distribution. ICL currently achieves more than 70 percent of turnover through direct sales while its network of dealers and VAR's [value-added reseller] is underdeveloped. "This is not a disadvantage," claims Mills, "since it implies that customers remain unaware of any changes in distribution channels." Moreover, ICL is specialized in offering solutions and has managed to gain a foothold in some large companies. An example of this is the German Bundespost, which placed an order for 240,000 PCs and 10,000 terminals. "Nevertheless, we seek to increasingly employ conventional distribution channels in the future." Mills said that ICL will concentrate especially on VAR's and less on dealers.

First of April

The line of PCs varies from single-user desktops to multiuser servers and is based on the well-known 386SX, 386DX, 486SX, and 486DX Intel processors. The range includes systems based on ISA and EISA [expansions not given] buses. The smallest model is a slim-line PC characterized by a very low noise level of 17dB. The most advanced model can operate two 50 MHz 486 processors and has 14 slots available. The processor is upgradable in the majority of the PCs. "Freestyle" is a remarkable product featuring a 256 color LCD [liquid crystal display] based on thin-film transistor technology. The screen is only 12 inches wide. The small size and low weight of the monitor make it extremely mobile. ICL supplies an extra long cable with this computer.

All PC products are available as of 1 April. "Just a joke," explained Mills. "With these products, we want to play a trick on our competitors on April Fool's Day."

Eutelsat 1991 Results Presented

92BR0300 Antwerp DE FINANCIEEL-EKONOMISCHE TIJD in Dutch 8 Apr 92 p 11

[Article: "Gulf War and Eastern Europe Yield Big Profits for Eutelsat"]

[Text] Last year, television companies intensively used the satellite links offered by the European telecommunications satellite organization Eutelsat for their news coverage of the Gulf War and the events in Eastern Europe. The organization announced in Paris that its 1991 profit increased by as much as 55 percent is partly due to these events.

Last year, the use of Eutelsat satellites for direct television reporting increased by 90 percent. Because Eutelsat gets 67 percent of its overall profit from the use of satellite links by radio and television stations, the events in the Middle East and Eastern Europe had a favorable impact on its operating results.

Eutelsat, whose satellites also support telephone and data links, increased its profit to 925 million Belgian francs [BFr] (up 55 percent); profits over the 1990 amounted to BFr611 million. Turnover increased by 48 percent from BFr5.5 billion in 1990 to BFr8 billion in 1991.

At present, the organization has seven satellites in use. The last one was commissioned last January. Eutelsat, in which 28 European countries participate, intends to launch two more telecommunications satellites later this year.

France: Aviation Equipment Firms Restructure

92WS0390B Paris L'USINE NOUVELLE in French 20 Feb 92 p 28

[Article by Jean-Pierre Jolivet: "Aviation Equipment: Large-Scale Maneuvers Start"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Changes at the summit of SFIM [Measuring Instruments Manufacturing Company] and Intertechnique. The political and economic environment is not favorable. Research and development costs are rising. Alliances? Takeovers? Anything is possible.

Two pioneers are quitting the scene of the French aviation equipment industry, adding to the uncertainties hovering over this industry. Jacques Larpent, 68, the CEO of SFIM for the past 30 years, is retiring. On 1 March, he will turn his position over to Francois Bujon de l'Estang, adviser to the president of CNM [Mixed Navigation Company], one of SFIM's principal stockholders together with Framatome. At Intertechnique, at the conclusion of its June general assembly, its president and founder, Jacques Maillet, 78, will be replaced by Edmond Marchegay, the company's general managing director.

Although long expected, the departures of the heads of SFIM and Intertechnique are materializing in a climate of growing uneasiness. There is a fear in both of these enterprises that the precarious equilibrium has been broken, to their detriment. Will the big firms of the sector (Thomson-CSF, Sextant Avionique) be tempted to advance their pawns to corner a maximum of activities? Will the ministries be tempted to remodel the sector? And will the shareholders be constrained to revise their commitments?

These questions are the more agonizing as the French equipment manufacturers are being hard-hit by the hassles of an unfavorable environment. Added to the drastic budget cuts is a disastrous slump in the air transport sector that translates into a sizable drop in order for civil planes.

After several months of "wait-and-see," in the hope of a recovery that has not come about, the sector has turned to staff reductions. Sextant Avionique, a subsidiary of Thomson-CSF and Aerospatiale, has announced a cut of 1,150 jobs; and Labinal, 350 jobs. SFIM and Intertechnique have not been spared, and are having to reduce their staffs by 90 and 120 persons respectively. And this, despite an intent to adapt their strategy to the recession.

In the face of a slump in its navigation branch (a historical activity), SFIM—which employs 2,400 persons—turned to strengthening its flight recorder activities (more than 80 airline companies use them), and its in-flight test equipment (it is participating in the EFA [European Fighter Plane] program and flight control equipment activities). The firm is the top European supplier of helicopter automatic pilots.

But it is mainly in the very promising field of optronics that Jacques Larpent found potential relief. Last June, he acquired 66 percent of Sopelem, providing SFIM with an opportunity to become the third French giant in the specialty alongside of Thomson-CSF and the Sagem group, but also an opportunity to find European alliances. And the more easily as it already derives 72 percent of an annual revenue of 1 billion francs [Fr] from exports.

This is not the case of Intertechnique and its 2,200 employees, 65 percent of whose activities derive from the firm's still very Hexagonal [reference is to metropolitan France] orientation. Since the sale of its data processing services subsidiary IN2 to Germany's Siemens toward the end of 1989, Intertechnique has embarked on a refocusing of its activities on its strong points. Essentially, these are in the domain of fuel circulation and measurement systems, in which the firm is unquestionably the European leader, equipment for the production of oxygen in planes (the Eros GIE [economic interest group] is the world's leading supplier), and electric power generation, control, and protection systems.

Inevitable Alliances

With 20 percent of an annual revenue of Fr1.5 billion being derived from the sale of electronic detection and surveillance equipment and systems, Intertechnique is still too dependent on the aviation market. Having anticipated an increase of 10 percent in its volume of sales beyond the end of 1991, and expanded its structure accordingly, the Plaisir (Yvelines)-based firm took the full force of the economic downturn. The bottom line: A tobogganing revenue, and restructuring costs that will burden its 1991 results with debt.

Both these aviation equipment middleweights face the same problem: financing an increasingly bulimic research and development effort even as the military and aviation markets collapse. The situation is urging SFIM and Intertechnique in the direction of alliances, while seeking nevertheless to avoid being devoured. Intertechnique can count on the loyalty of its shareholders, Dassault and Rivaud, for support. Will SFIM find the same degree of support forthcoming from the Mixed Navigation-Framatome team-up?

France's Sextant Avionique Restructures

92WS0446C Paris L'USINE NOUVELLE in French 12 Mar 92 p 30

[Article by Jean-Pierre Jolivet: "Sextant Avionique Specializes Production Facilities"—first paragraph is L'USINE NOUVELLE introduction]

[Text] The slump in civil and military aeronautics is forcing Sextant Avionique to redeploy its industrial plant—and to eliminate more than a thousand jobs...

One specialty per plant: That's the guiding concept behind Sextant Avionique's industrial restructuring. The plan, which calls for the elimination of close to 1,100 jobs from a workforce of 6,500 people, is a drastic one—as drastic as the situation itself: In 1991, the French aviation equipment company's turnover declined 7 percent to 5.56 billion French francs [Fr], and it posted losses of Fr500 million (including Fr380 million in reserve provisions).

The crisis in the air transport sector and the stretch-out of military equipment orders (Fr400 million in orders for 1991 were canceled) have hit hard. All the same, the sudden discovery of the size of the deficits has shown the limitations of a matrix organization that never functioned properly.

From now on, Sextant Avionique is going to specialize its industrial facilities: Velizy will build on-board computers and automatic testing equipment; Le Haillan (near Bordeaux) will produce visual display equipment and interfaces; Valence, navigation aids and automatic controls; Conflans-Sainte-Honorine and Vendome, cockpit instrumentation (altimeters, clocks, etc.). The facility at Chatellerault, an offshoot of SFENA [French Air Navigation Equipment Company] is taken apart. Artificial horizon activities are transferred to Vendome, and the high-precision mechanics unit will be sold. The site will become the [company's] international logistics center, bringing together the repair and maintenance facilities which in the past were divided between the various production units and Orly.

Reorientation Unfinished

This vast restructuring by no means solves all the company's problems. "Specialization of the sites, which are also responsible for research, could lead to a lack of synergies. And this at a time when Sextant Avionique is trying to strengthen its integrative approach," trade union sources say. Other questions also remain unanswered. Will the Valence facility soon stop producing industrial components? Will navigation products remain a part of the group, despite the persistent talk about Sagem's interest in acquiring Sextant's laser gyros?

Sextant Avionique, which must self-finance a growing share of its own research activity in markets that are increasingly competitive, has certainly not completed its reorientation.

FIAT's Competitiveness, Research Investments

Garuzzo on Company Strategy

92WS0462A Duesseldorf HANDELSBLATT in German 6 Apr 92 p 21

[Article by Friedhelm Groeteke and Waldemar Schaefer: "FIAT Group: Interview With Head of Automotive Division, Giorgio Garuzzo: Location Problems Even in Italy: The Market Will Continue to Grow: 'We Don't Need Any Strategic Alliances'"]

[Text] Turin, 4-5 Apr—"I assume that the big eight European automakers (BMW, FIAT, Ford, GM/Opel, Mercedes-Benz, Peugeot/Citroen, Renault, and VW) will still be around in the year 2000." Giorgio Garuzzo, head of the automotive division of the FIAT group, seems quite calm, despite the substantial problems both at his own company and industry-wide: Over the past few years, FIAT has had to accept losses of market share on its domestic market—since 1988, more than 13 percentage points, from 60 percent to the current 47 percent. Demand is weak all across Europe: For 1992 (see HANDELSBLATT of 6 March), a drop in the number of registered cars of 1.6 percent is expected, to 12.99 million passenger cars. And nearly all European automakers, including the German ones, are announcing significant cuts in the workforce.

The calmness exhibited by Garuzzo in his interview with HANDELSBLATT is based on his conviction that the EC agreement with Japan on a 10-year restriction on exports to the Community will be adequate to achieve the needed competitiveness. The FIAT executive believes that his opinion "corresponds to that of the ACEA," the association of European automakers, whose chairman "is my friend von Kuenheim."

EC Agreement With Japan is Adequate

In contrast, an entirely different opinion is held by Jacques Calvet, head of the private French auto company PSA-Peugeot-Citroen, a coproduction partner of FIAT. Calvet fears "the downfall of the European automotive industry" if Japan is not kept away from the European market longer and more effectively than the EC has agreed to.

Perhaps his knowledge that complaining serves no purpose is a determining factor in Garuzzo's view. On the other hand, agitation does not seem to be a trait of the 54-year-old electrical engineer, who came to FIAT as Carlo de Benedetti's assistant in 1976 as part of the takeover of supplier Gilardini, who remained after de Benedetti's departure, and who is now considered the number-three man in the FIAT hierarchy, after Giovanni Agnelli and Cesare Romiti.

He depicts things as he sees them. Competition cannot be avoided, he says, and it is similarly unavoidable that it will continue to intensify. However, FIAT has "always been used to competition. We have accepted open competition by mere virtue of the fact that the Italian market is not big enough for FIAT." For this reason, 1993 represents only one step on this road of intensifying competition.

At present, however, virtually every country with automobile production has taken protective measures against the Japanese, he says. "Even Germany has concluded private agreements according to which Japanese automakers cannot exceed a market share of 15 percent, and given the size of the German market, that means twice as many cars as it would mean in Italy." Italy and France currently have a restriction of 3 percent, according to Garuzzo. However, France is restricting imports unilaterally, while Italy negotiated the limit with Japan.

Garuzzo assigns less importance to the problem of Japanese production installations in Europe, or transplants, than do many of his colleagues. Plants set up in the open countryside always offer advantages initially, he says. "But over the course of the installations' lifetimes, these advantages gradually diminish, and that is also true of the Japanese installations in Europe."

"If the restrictions fall away gradually," Garuzzo believes, the Japanese will "take market shares away from other foreign makes and from FIAT, in Italy and elsewhere." In order to compete with Japan, "conditions similar to those in Japan must be created"—independently of what the companies can and must do. For example, social security contributions, which account for 17 percent of wages in Japan, but 50 percent in Italy.

There are also significant differences in terms of interest and energy costs, Garuzzo says. With respect to these costs, he sees location disadvantages for Italy not only compared to Japan, but also compared to France: "Only a couple of dozen kilometers from Turin, on the other side of the Alps, production costs 15 percent less than it does here, thanks to nuclear energy."

Italy's position compared to the FRG has also worsened, according to Garuzzo: "Over the past five years, wages in Italy have risen at an annual rate of 8 to 9 percent. In contrast, that increase has been only half as much in Germany. Since the lira-German mark exchange rate has remained essentially constant over that period, we have lost 15 to 20 points in relation to the FRG." Although production is still cheaper than in Germany, it is more expensive than in France. If the situation in Italy continues to worsen, he says, then FIAT will be forced to move production abroad.

This would scarcely present any major organizational problems, according to Garuzzo. The FIAT concern owns various types of production sites in nearly every Western European country, as well as—including

licenses and investment holdings—in Poland, Yugoslavia, Turkey, and Russia. Moreover, the concern is active in the motor vehicle industry in North Africa, South America, on the Indian subcontinent, and in China. FIAT is not involved in the other East Asian countries, nor in North America: "There we have no plans for marketing mass products."

Slight Production Decline in Current Year

Of the company's 280,000 total employees, 46,000 work elsewhere in Europe and 27,000 work abroad, with the focal point in Brazil. On the continent, Garuzzo says, FIAT is "the most European automaker." As such, Garuzzo is betting on further growth in the European market. He is anticipating 15.5 million new car registrations each year in Western Europe by the year 2000. Last year there were around 13.3 million. However, the market growth will not be linear, but rather will be subject to significant fluctuations, he says. Given the decline in registrations in the EC expected for 1992, FIAT is planning on a 2 percent cut in production compared to last year.

In the medium and long term, however, FIAT's prospects are good, Garuzzo believes. On the one hand, the company has a very good market and production structure, which must be maintained: Of the consolidated, total sales by the FIAT automotive division of the equivalent of nearly DM78 billion last year, passenger cars accounted for around 50 percent, commercial vehicles for 25 percent, with the remaining 25 percent going to diversification (automotive and industrial subcontracting, agricultural and construction machinery). "With this breakdown, FIAT is unique among automakers in Europe. This gives us considerable strength."

These individual spheres—the Iveco commercial vehicle group or suppliers such as Magneti Marelli—"have enjoyed a large degree of autonomy for years now." For example, only one-quarter of Marelli's sales comes from FIAT plants, Garuzzo says. And those plants are completely free to cover their needs from Marelli or from Marelli competitors such as Bosch. "The principle of competition must be applied within the concern, so that we can remain externally competitive as well."

Garuzzo considers the market position of the individual spheres in Western Europe to be "very good." In the area of passenger cars (the FIAT, Alfa Romeo, Ferrari, Lancia, and Maserati makes), he figures a total market share of 12.9 percent, and thus the number-two position on the market. In commercial vehicles (FIAT, Lancia, Magirus, Unic, and Iveco Ford), the concern is number one in light trucks between 1.8 and 3.5 tonnes, with 16.3 percent of the market, and in vehicles between 3.5 and 4.9 tonnes, with 23.9 percent. FIAT is number two in trucks over 5 tonnes, with 17.7 percent of the market. And the company is also in the top three in the field of buses, forklift trucks, tractors, and agricultural and construction machinery.

In order to maintain its position "in the interest of our stockholders, our workers, and also our customers," significant investments in research and development are planned for the next few years. In 1991, DM2.6 billion was spent here, with the emphasis on passenger cars (DM1.6 billion) and commercial vehicles (DM0.5 billion).

In addition, there were investments of DM4.5 billion in fixed assets. Here too, the greatest share went to the areas of passenger cars (DM2.9 billion) and commercial vehicles (DM0.8 billion). With the rapid investment pace that is to be maintained, FIAT hopes to introduce new models on the market faster than before, and also to quickly convert production in the direction of "lean production and lean organization"—the buzzwords coming from Japan.

However, the way in which production costs are to be lowered significantly, which will also force further layoffs, should be unique in nature. As an example, Garuzzo cites the new Melfi plant (see article below). Here, setting up new facilities "in the open countryside" is reportedly easier than in the existing plants. Nevertheless, the older plants will also be converted as quickly as possible.

As far as model cycles are concerned, Garuzzo would like to change over to six years "instead of the eight to 10 years that has been the standard for the life of a model in the worldwide auto industry." In the coming years, at least two new models a year should be put on the market in the area of passenger cars. Entirely new series are also planned in all branches of commercial vehicles.

On the whole, FIAT feels that it is strong enough to make it on its own, even in the future. Garuzzo rejects the idea of strategic alliances. In contrast, "tactical alliances," whether joint ventures in certain areas, the exchange of components, or the joint development of components as well as individual models, is something that he wants to enter into to a greater extent in the future.

New Production Methods

92WS0462A Duesseldorf HANDELSBLATT in German 6 Apr 92 p 21

[Unattributed article: "New Production Methods in Melfi"]

[Text] Turin—In the southern Italian development area, just past the ankle of the Italian boot, FIAT is currently building an automotive plant with a completely new overall design. With only 7,000 employees, this Melfi plant will be able to build a half a million FIAT Uno cars a year, thus manufacturing at one-tenth the cost of all other FIAT auto plants.

Is FIAT perhaps copying Japanese models here? Is the company applying German organization methods? Absolutely not. The system, which is supposed to run for the first time at this order of magnitude, was developed

at FIAT, and has already been tested on a smaller scale (at the Cassino plant). Its foundation is a new type of labor concentration and a new type of hierarchy.

The elements are called Basic Technological Units (UTE's), organizationally autonomous work teams for production phases. This organization has nothing to do with group work, which many automakers have been testing for some time now as an alternative to the assembly line, after Volvo introduced it at two plants back in the early 1970s.

In these UTE groups, which can comprise between 25 and 50 people, depending on their job, all functionally relevant managers, office personnel, and workers are united, both hierarchically and in terms of their presence on the job site.

Thus, the new plant has none of the traditional central management structure. Workers and office personnel perform largely alternating functions, whereby the hierarchy is based on coordination. In this way, various levels are eliminated between "top" and "bottom," and based on the experience gathered thus far, FIAT hopes to achieve greater team spirit, the elimination of inhibiting filters, and higher quality.

But that is not all there is to it. The plants and warehouses of 16 suppliers are under construction directly adjacent to the plant premises for auto production, on the side bordering on auto assembly, i.e., the last phase of production. These suppliers can feed their products into the FIAT manufacturing system openly and by the shortest route ("just in time").

There are rail connections between final assembly and the test course, so that the finished cars do not go to a store yard, for example, but are instead transported away immediately. FIAT was able to negotiate with the labor unions a six-day production week with three shifts a day. Only Sunday is reserved for the more complicated maintenance and repair work.

The basic rules of this "short factory" should be applied to all auto factories of the FIAT concern after a successful overall test—with a considerable investment outlay, of course.

Without the almost omnipresent use of computers, moreover, this new organization of production plus management in one unit—and thus perhaps a new approach to a more human-oriented production process—would not be possible. If Melfi satisfies expectations, then FIAT could have a "secret weapon" in its efforts to restore its market share in Europe, which has been dwindling in recent times.

Strategy for German Machine Tool Companies Proposed

92WS0464A Duesseldorf HANDELSBLATT in German 7 Apr 92 p 25

[Article by Peter-Juergen Kreher, chairman of the board of Deckel AG: "Machine Tool Manufacture: Japanese Companies Have Displaced U.S. Manufacturers and Established Themselves in Europe: Cooperative Arrangements Are Urgently Necessary for the Survival of German Manufacturers"]

[Text] Munich, 6 Apr—The world market leader in machine tools, which are considered the core components of industrialization, is Japan, with a 1990 production share of 23.3 percent, compared to the FRG with 18.9 percent. In the mid-1970s, Japanese machine tool manufacturers, supported by MITI [Ministry of International Trade and Industry], conquered the U.S. market with "cost prices" as much as 60 percent below the U.S. market level.

German Manufacturers	1990 Sales
Trumpf	DM726 million
Gildemeister	DM716 million
Pittler	DM665 million
Maho	DM650 million
Schuler	DM640 million
Deckel	DM636 million

In the period that followed, many prominent U.S. machine tool manufacturers disappeared, while others have vegetated their way into irrelevance since then. In the meantime, major Japanese manufacturers such as Okuma, Yamazaki-Mazak, Makino, Mitsubishi Heavy Industries, or Hitachi Seiki set up their own plants in the United States, thus avoiding the expected import restrictions, which the U.S. Government did later impose. Southeast Asia and Australia are now "home markets" for the Japanese, and are firmly in their grip.

Since the last recession in the early 1980s, Japanese machine tool manufacturers have been penetrating the European market. They have already achieved major successes in establishing themselves in England and France. With the worldwide economic slowdown since the end of 1990, they are now pushing their products with greater intensity onto the German market as well. Penetrating Germany offers the Japanese the best prospects for finally dominating the world market.

In the past, the German machine tool industry has been able to hold its own, but it comprises primarily medium-size companies and is thus unable to operate strategically with the necessary strength. It is also notable that in 1990 no company from the rest of Europe achieved sales of more than 500 million German marks [DM]

Although the machine tool industry has often experienced sharp fluctuations in demand, the decline in

incoming orders—at least among volume manufacturers—of approximately 30 percent over the previous year is unprecedented in its harshness. On the most important foreign markets, growth has been negative since 1988. Domestically, extraordinary market conditions offset this trend until the end of 1990.

Because of losses of foreign markets, especially the entire eastern market, stagnation in the five new Bundeslaender, and the consequences of the tax increase, investment behavior as well as the business climate in the machine tool volume trade have worsened dramatically since the end of 1990. In the Far East and here, there has been no discernible threat to growth, and in the United States there is significant potential for medium-term growth, which at present is not being—or cannot be—adequately exploited by European manufacturers.

While the average sales per worker in Germany is around DM200,000, the market-leading Japanese are achieving a productivity level that is twice as high (highest value: Miyano at DM497,000). The outstanding Japanese productivity figures are the result of larger volume, heavily automated production, a high supplier share, and distribution of the products by way of dealer organizations.

During recession phases, most German manufacturers suffer losses that often cannot be adequately offset in boom times. The average return on sales of the biggest Japanese machine tool manufacturers is 14 percent, thus surpassing that of the German machine tool industry by an average of 10 percent. The top company in the Japanese industry, Mori Seki, achieves as much as 28 percent.

The survival of the German and European machine tool industry is the basic precondition for an independent western high-technology industry that is safe from foreign control. The companies active in the volume market will survive only if they merge into larger entities. If this is not done, then even the niche suppliers will disappear from the market in the medium term, since the next generation of engineers will not see sufficient career prospects there.

Worldwide market penetration, accompanied by optimization of marketing costs, can be ensured only through cooperation. In the short and medium term, the German machine tool industry must massively consolidate its presence, especially outside Europe, in order not to fall too far behind the Japanese competition. Because of the resulting higher sales and returns basis, product innovations can be put on the market with new opportunities for distribution and gains of market shares.

Unions should be effected not only through company mergers. There are many possibilities here, from joint development and production—the use of identical components such as tool changing systems and uniform CNC [Computer Numeric Control] control systems should be noted here in particular—to joint purchasing—based on the model of many purchasing cooperatives, for example—to joint marketing organizations. It is clearly high time for such cooperative arrangements if the production of machine tools is not to suffer.

In so doing, of course, every company must give up part of its former freedom; given the declining returns and the increasing threat to survival, this is certainly an acceptable "loss." But antitrust authorities—in Berlin as well as in Brussels—must also abandon their current restrictive attitude, even adopting a stance promoting cooperative arrangements or mergers. There is also a need here for political action, especially with regard to economic policy. Politicians should not stand by idly while the key technology of Western European industry threatens to collapse under the weight of bureaucratic issues.

In realizing cooperation, there will be a regional reduction in capacities, be it in the area of administration, in production, or elsewhere, in order to operate a joint, highly profitable capacity at one site. This requires understanding from the workers and unions on the one hand, and costs money on the other hand. This is why supportive and accompanying measures by the banks play a critical role. With the application of the proposed procedure, the German and European machine tool industry can gradually eliminate the strategically planned threat to its existence and take on a leading role in the contest with the Japanese.

Strategy for Austrian Machine Tool Builders Suggested

92WS0464B Duesseldorf HANDELSBLATT in German 7 Apr 92 p 25

[Unattributed article: "Machine Tools: Opportunities for Austria's Industry Through Consistent Niche Policy: Diebold Study Recommends That Companies Use Cooperative Instrument"]

[Text] Vienna, 6 Apr—In an industry study, the Austrian subsidiary of the management consulting firm Diebold GmbH concedes that the approximately 50 Austrian machine tool manufacturers have opportunities even in world markets characterized by marketing problems, but says that the niche policy should be implemented more flexibly and consistently. Still, strategic alliances will reflect the worldwide trend towards standard machines.

After years of steady growth, Austria's machine tool manufacturers suffered a drop in sales last year of around 9 percent, to approximately 5 billion schillings, while exports to Germany, the most important customer country, fell from 1.7 to 1.45 billion schillings. The number-two buyer was the CSFR, with 180 million schillings (after 220 million schillings), followed by France (178 after 198 million schillings) and Switzerland (139 after 127 million schillings). The export quota came to 75 percent.

The Diebold study with the indicative title "Machine Tool Industry: Cyclical Decline or Structural Crisis?"

states that although the serious slump in sales by European machine tool manufacturers does have a cyclical cause, structural weaknesses in European producers are also discernible. U.S. manufacturers have dealt with a similar crisis since the mid-1980s, during which time production has declined massively and the share of imports has risen to more than 50 percent.

According to Diebold, the classic metal-cutting machine tool industry has entered a mature stage worldwide. This is indicated by a more mature level of technology, associated with substitution tendencies through new technologies such as laser machining or erosion technology, as well as by the increase in the share of service activities in overall sales. A change in market behavior away from expensive, complicated manufacturing technologies in favor of standard machines will also affect European machine tool manufacturers in particular.

There are companies, according to Diebold, that are not only managing to survive in mature markets, but are in fact earning high returns at the expense of other producers on the market; Japanese manufacturers are especially well-suited for mature markets. Analyses of the returns on sales achieved by Japanese companies show a significantly better sales-to-profit ratio than in the U.S. and European areas. This is true in particular of major companies with sales exceeding 5 billion schillings.

According to Diebold, this will provide justification for those German companies that see their future in an active acquisition and merger strategy. The remaining medium-size companies must function as specialists and protect their niche policy through high entry barriers.

As Diebold interviews show, the niche policy is already being pursued with success by several Austrian machine tool manufacturers. However, both export statistics and the decline in production values lead Diebold to conclude that the crisis in the last quarter of 1991 has reached the Austrian machine tool industry as well. The situation is aggravated by the fact that the majority of Austrian production relates to classic metal-cutting machine tools, such as milling machines and lathes. Strategic scenarios will reflect the trend towards standard machines. In this way, a niche policy based on the know-how of special production processes could become a perilous tightrope walk.

Even the former eastern states will probably not make things easier for the Austrian producers in the medium term. Some states, especially the CSFR, are already looking more like competitors on the market than potential clients. For smaller companies in particular, "resource management" in order to protect the niche policy or establish oneself in new niches could become the main issue for survival. Cooperative arrangements "of a highly varied nature" are the logical consequence. The biggest Austrian manufacturers in 1990 were Emco (1.23 billion schillings in sales), GVM (1.04 billion schillings), VA Steinel (1.08 billion schillings), Heid (270 million schillings), Krause (200 million schillings), and Salvagnini (270 million schillings/1991).

European Dependence on Japanese Microelectronics Studied

92WS0464C Duesseldorf HANDELSBLATT in German 3-4 Apr 92 p 28

[Unattributed article: "VDE/VDI: 'Trends in Microelectronics' Study Presented in Hannover: One-Half of All Chips Today Come From Japan"]

[Text] Hannover, 2 Apr—"In the future, technical development in Europe will be increasingly dependent on chip products from Japan and the United States," warned Dr. Friedrich Dankward Althoff, secretary general of the Association of German Electrical Engineers (VDE), adding that a new trend analysis on microelectronic applications up to the year 2000 has fully confirmed the alarming predictions made in other studies.

The market study was drawn up by the VDE/VDI Microelectronics Association. According to experts, the use of microelectronics in the coming years will continue to rise sharply; worldwide sales will grow from approximately $51 billion in 1990 to around $150 billion in 2000.

While Western Europe currently consumes—i.e., uses in products—around 18.4 percent of all the chips produced in the world, it accounts for only around 11 percent of total worldwide production of integrated circuits (ICs), said Dr. Heinz Stephanblome, chairman of the VDE/VDI Microelectronics Association, in explaining the results of the study. In this way, European users are seriously dependent on the big producers, most of all the Japanese, who already supply just under 50 percent of the necessary ICs.

Stephanblome: "Microelectronics is not an isolated branch of the economy; rather, as a key technology, it has a critical impact on the engineering of classic capital goods." For this reason, it is very important to Germany as an exporting country. Still, this importance is not reflected in its share of production values, because at 3.5 billion German marks the market for integrated circuits in Germany seems rather insignificant.

The study confirms that although microelectronics accounts for only one-half of 1 percent of the market of the five main user sectors (machine-building, electrical engineering, precision mechanics/optics/clock industry, motor vehicle industry, and office equipment/computer industry), the sales and export activities of these sectors depends on the availability of highly modern microelectronics. This so-called "Group of Five" contributes just under 40 percent of total sales in the processing industry, and provides 90 percent of the FRG trade surplus.

The VDE sees a danger that important technical developments could be delayed in the future if chip manufacturers in the United States and Japan withhold microelectronics components from their European competitors.

Difficulties of Eastern German Microelectronics Industry

92WS0464D Duesseldorf HANDELSBLATT in German 7 Apr 92 p 20

[Unattributed article: "Electronics Industry: Painful Adjustment in the East: Wissing Stresses Importance of Microelectronics"]

[Text] Hannover, 6 Apr—"Germany must not let microelectronics slip away, because 60 to 70 percent of the processing industry is dependent on it." This is what Dr. Franz-Josef Wissing, the general manager of the ZVEI [Central Association of the Electrical Engineering Industry], told HANDELSBLATT at the Hannover trade fair. Moreover, he said, the dependence on microelectronics is growing.

On the economic situation in the industry, Wissing said that the exceptional boom over the past two years stimulated by the pent-up demand in the new Bundeslaender cannot continue. A real growth in production of no more than 3 percent is expected for 1992 (last year: 5.6 percent).

There are flagging tendencies in the customer industries, Wissing said. Besides machine-building, this is also being seen in, among others, the auto industry, which accounted for 8 to 9 percent of last year's industry sales of 207 billion German marks. Given the strong competition in pricing, moreover, automobile suppliers are increasingly looking for production sites abroad.

The eastern German electrical and electronics industry, whose workforce has already fallen from the original 320,000 to below 150,000, and which will probably drop even further, is undergoing, as Wissing called it, a "very painful adjustment process." Still, the most difficult phase is probably over. The decline in production was halted at the end of 1991. Sales per worker in the fourth quarter of 1991 amounted to only 25 percent of the value in the old Bundeslaender, the ZVEI announced recently.

Of the approximately 450 companies in the industry in eastern Germany, of which 120 are ZVEI members, three-quarters are still in the hands of the Trust Agency. Wissing sees opportunities for eastern German companies as suppliers, among other things. In addition, there are business opportunities in telecommunications, energy, transportation, and the production of cables and turbines.

In the field of energy, there are delays due to the unclear legal situation in connection with establishing new municipal plants. Wissing sees only scant opportunities for the production of consumer goods in eastern Germany; the consumer goods wave is running out there.

French Machine Tool Firms Face Market Changes

92WS0482A Paris L'USINE NOUVELLE in French, No 2369, 9 Apr 92 p 24

[Article by Odile Esposito: "Machine Tools Caught Between Cost Cutting and Innovations"; first paragraph is L'USINE NOUVELLE introduction]

[Text] The "down-in-the-dumps" machine tool industry has put investments on hold while it awaits further restructuring.

For the last several months, the primary concern of machine tool manufacturers has been to manage the slump. A 15 percent drop in production and staff cutbacks of 3 percent in 1991 made optimism a scarce commodity in the hallways of the 1992 Machine Tool Show these last few days. The recipes for getting through the next few months, until a desperately awaited recovery comes through, vary. Some manufacturers maintain a steely morale. But no one believes that there will be any miracles.

"The French machine tool industry will not survive a slump like that of 1981-85," warns Jan Mayot, the general secretary of Symap, the industry's union. So far the damage has been limited, thanks to the reserves squirreled away during the salad days of 1986-1990. "Our sales declined 20 percent in 1991," admits Jean Nicolas, the assistant director of Somab, a Moulins company that employs 170 people. "And starting last April, working hours were cut back to 32 a week." That stratagem is so widespread in the machine tool industry that Symap has just requested authorization to extend the definition of partial unemployment from 600 to 900 hours a year! Investments have been put on hold everywhere. "During the good years, we invested 5 percent of our sales annually," explains Georges Jeanney, the CEO of Dimeco, a small Besancon group with sales of Fr120 million. "We bought several machining centers, for automation is the only way to compete with low-paying countries. But this year we plan to spend moderately and watch our budget more closely." Michel Courtois, the CEO of Dubus, which specializes in woodworking machines, shares the same preoccupation. "We have laid down very strict purchasing quotas," he explains. "And we systematically resell all machines that are not used to 100 percent of their capacity." Cost-cutting: the word is fashionable everywhere except engineering and design departments. "We are currently recruiting people with advanced technician certificates for our engineering and design department, which already employs 17," explains Georges Jeanney. "It was innovation and our efforts to adapt to German standards that enabled us to make 45 percent of our sales from exports and to withstand the downturn. Today the German market is flagging. But we are creating subsidiaries in Brazil, India, and Iran." As a

result, Dimeco has no hesitation in forecasting a 6 percent increase in its sales in 1992.

But what about the newcomers? Despite the slump in the industry, several companies have recently been formed. For these firms, innovation is still primordial. The small company Melcer, for instance, which was created in 1990, took advantage of an ANVAR [National Agency for the Upgrading of Research] grant to develop a precision lathe suited for micromechanical finishing work. After snagging several orders in France, it is going after the German and American markets.

A New Stream of Alliances

Matel Company founded Mecamatic France in Albi in August, 1991 from a portion of Mecamatic's assets that it had acquired. The new company specializes in robotized machines for graphic arts. To turn the know-how of its engineering and design department to account, Mecamatic France created a department specializing in stamping. The department has already received several orders. "We expect stamping machines to account for one-third of our Fr40 million in turnover in 1992," says Maurice Gamay, its CEO. "And within three years, the two businesses will equal each other." Maurice Gamay plans to invest Fr4.4 million this year to purchase equipment and expand his shop space.

Despite these few optimistic notes, gloom is still the order of the day. The only consolation is that the slump is worldwide. It will certainly give rise, however to a new stream of partnerships and restructurings. Unfortunately, the machine tools industry is used to that.

France's Cire Expands Electronics Activities

92WS0482B Paris L'USINE NOUVELLE in French, No 2359, 9 Apr 92 p 25

[Article by Daniel Coue: "Cire Expands Its Electronics Line"; first paragraph is L'USINE NOUVELLE introduction]

[Text] The group is moving into mass production of wired boards and assembled computers.

Talk about an appetite! Barely four years after taking over their firm through an employee buyout, Cire's management plans to absorb the Amilly factory of Alcatel-CIT's transmissions department, which is near Montargis (Loiret). The takeover will save about 175 of the plant's 300 jobs, based on the volume of orders Alcatel is guaranteeing and the contracts Cire has won despite the poor economic climate.

"We are just pursuing our manufacturing strategy, that's all," comments Jean-Jacques Legrand. The takeover gives Cire a foothold in the mass production of wired boards and assembled computers. The group had sales of Fr206 million in 1991—up 13 percent over 1990—and employs 360 people who have been spending the bulk of their time manufacturing printed circuit boards (83 percent of the firm's business). Six of Cire's seven plants specialize in circuit boards. Each has mastered a specific process that corresponds to specific market segments, which range from prototypes to large runs, one-sided to multilayered boards, and circuits for classic components to circuits for CMS (surface-mounted components). Cire covers a lot of ground.

Up till now, however, only its Bellegarde Electronique subsidiary (55 employees, sales of Fr31 million) was active in the medium- and small-run market for board assembly and wiring. And there was one element missing in the picture: assembly and wiring of large runs.

The Critical Mass for Europe

The Amilly plant, which produced repeaters, modems, and multiplexers, will close the gap. At the same time, it will give Cire the critical mass it needs for Europe. "Of course, for any component that is simple and produced at great speed, our Asian competitors are unbeatable," acknowledges Jean-Jacques Legrand. "But today, consumer electronics is not necessarily synonymous with bottom-of-the-line. At the same time, occupation-specific and industrial electronics are requiring larger and larger runs. In short, the markets are out there."

Cire will also play up its ability to meet short turnaround times—a quality of service that the Taiwanese and Koreans cannot match. The secret of the company's responsiveness is its extremely decentralized organization and know-how, and a rule: one factory and one team for one market. That "small difference" is what distinguishes the group from its French and European competitors.

Sweden: Ericsson's 1991 Results Presented

92WS0499E Chichester INTERNATIONAL TELECOMMUNICATIONS INTELLIGENCE in English 23 Mar 92 pp 17-18

[Text] As expected, due to the continuing recession worldwide, Ericsson's 1991 pre-tax income fell 67 percent to SKr1,604 million from 1990's level of SKr4,855 million. The figure for 1991 included a charge of SKr835 million that was allocated for future restructuring costs. Net capital gains, after deduction for minority interests, accounted for SKr229 million of pre-tax income versus SKr112 million in 1990.

Income net of taxes declined 76 percent to SKr760 million from SKr3,149 million. Income per share, after actual taxes paid and after full conversion, was SKr3.69 against SKr14.66.

Consolidated net sales in 1991 totalled SKr45,793 million, just up on 1990's level of SKr45,702 million. Of 1991's total 87 percent of sales went to customers overseas compared with 88 percent a year earlier. Order bookings decreased 9 percent to SKr44,758 million from SKr49,371 million and order backlog at year-end was SKr28,777 million compared with SKr30,415 million.

Sales by Business Area (SKr millions)

	1991 Total	1991 of which External	1990 Total	1990 Of which External
Public Telecoms	21,924	19,517	22,614	20,414
Radio Communications	12,371	12,276	11,693	11,564
Business Communications	4,870	4,720	4,922	4,781
Cable & Network	7,022	6,506	6,795	6,484
Components	2,214	985	1,905	589
Defence Systems	1,825	1,611	1,890	1,758
Other Operations	1,023	178	789	112
Less; Intersegment Sales	-5,456	0	-4,906	0
Total	45,793	45,793	45,702	45,702

The 3 percent decline in the Public Telecommunications sector was due mainly to a much lower level of capital spending in the Spanish market, Ericsson said. The deferrment of orders in a number of other markets was also a factor in the decrease. Gains were recorded notably in the United States, the People's Republic of China and Argentina.

The Radio Communications area increased its sales mainly in the mobile telephone systems sector in the U.S., Italy, Germany and Malaysia. Sales were lower in Canada, Australia and the UK.

The 1 percent in sales by the Business Communications sector was due primarily to reduced demand for telephone instruments and small subscriber exchanges, but sales of the MD110 subscriber exchange systems and data networks were higher. Sales in the German market were particularly strong.

The Cable and Network division reported a 3 percent increase in sales, attributable mainly to the Italian, Thai and Turkish markets. Sales in Sweden declined, however.

Sales of power supply components in the Components business area were higher, as a result of the transfer to operations in Spain and Mexico from Public Telecommunications. The sales of microcircuits fell.

Sales by Geographic Area (SKr millions)

	1991	1992	% chg
Sweden	5,831	5,509	+5.8
Europe, excluding Sweden	20,077	21,563	-6.9
U.S. and Canada	5,819	5,936	-2.0
Latin America	5,779	5,441	+6.2
Africa	667	866	-23.0
Middle East	1,750	1,200	+45.8
Asia	3,947	2,685	+47.0
Oceania	1,923	2,502	-23.1
Total	45,793	45,702	+0.2

Consolidated operating income after depreciation was SKr2,291 million, a 60 percent drop in 1990's operating income of SKr5,694 million. Ericsson said its share in earnings of associated companies decreased from SKr300 million to SKr87 million, primarily due to the weaker economy in the Brazilian market. General expenses rose sharply, the company noted, mainly due to major technical commitments in the business areas for telecommunications systems.

Total selling, research and development, general and administrative expenses reached SKr19,892 million in 1991, an increase of 20 percent on 1990's expenses of SKr16,543 million.

In the future, Ericsson will combine the operating results of its Public Telecommunications, Radio Communications, Business Communications and Components business sectors under a new heading of Telecommunications Systems. This is because operations in these business areas are, to an increasing extent, interrelated. "Common technologies are utilised to a substantial degree and the systems being marketed often include components and products from several business areas. As a result, a division of their operating results does not provide a proper view of operational developments," the company said.

Operating Income by Sector (SKr millions)			
	1991	1990	1989
Telecommunications Systems	1,940	5,085	4,625
Cable and Network	434	580	350
Defence Systems	118	35	-46
Other operations, capital gains, general expenses and eliminations	-201	-6	-372
Consolidated Total	2,291	5,694	4,557

Ericsson's total expenditures for research and development, including costs related to customer orders, increased sharply from SKr4,901 million in 1990 to SKr7,054 million in 1991, equal to 11 percent and 15 percent of sales, respectively. Total technical development costs, which also include costs of adapting systems and products to specific markets, similarly rose steeply to SKr10,326 million, or 23 percent of sales in 1991 from SKr7,874 million, or 17 percent of sales a year earlier.

Capital expenditures for property, plant and equipment in 1991 totaled SKr3,583 million versus SKr3,448 million the previous year. Of these amounts, investments in Sweden came to SKr1,367 million in 1991 and SKr1,314 million in 1990.

Germany: BASF To Focus on Cost Management

92WS0541J Toddington NEW MATERIALS INTERNATIONAL in English Apr 92 p 8

[Unattributed article]

[Text] Sales and earnings of BASF AG are still affected by a continuing downward trend in prices caused by weak economic activity in major importing countries and surplus capacity in high volume product lines. "Indications of a quick recovery are nowhere in the offing," said Dr. Juergen Strube, chairman of the board of executive directors of BASF AG.

Business development has been disappointing, and this is reflected in the figures for 1991 and the first two months of 1992. In 1991, BASF sales remained constant at DM46.6 billion. In the same period, earnings before income tax declined 23.2 percent to DM2.18 billion. However, net earnings fell by only 6.1 percent to DM1.04 billion.

The BASF Group achieved net sales of DM7.7 billion in the first two months of 1992, an increase of 2 percent over the previous year. Earnings remain unsatisfactory, and incoming orders show no indication of a trend reversal.

"1992 remains a difficult year for BASF. What is essential now is to keep the course we have embarked on even if the wind is blowing in our faces," said Dr. Strube, echoing a feeling by many in industry.

In 1991 BASF achieved a cash flow of DM4.76 billion, while cash in hand totaled DM5.15 billion. After deduction of liabilities to banks and capital markets, remaining net cash amounts to DM1.23 billion.

BASF is therefore exploiting all opportunities for optimisation and reduction of costs including staff costs. By the end of the year the total number of permanent staff at BASF AG will not exceed 48,000. The BASF Group will employ no more than 120,000 employees at the end of 1992.

Dr. Strube believes that the ongoing restructuring process in the chemical industry will develop into two essentially different directions. On the one hand a few corporations with worldwide activities will hold a strong position in large product lines. Alongside these there will be smaller, specialised companies operating within niche markets.

On account of its specific strengths in large product lines, in chemicals and plastics, BASF will number among the few large chemical corporations with worldwide activities. The measures launched to achieve restructuring and concentration on core businesses are directed at consolidating and enhancing this position.

Examples of action taken include the sale of the Gerwerkschaft Auguste Victoria Coal Mine and the start of negotiations to shed the North American oil and gas operations. In the plastics and fibres division, the Elastogran Kuingststofftechnik plant at Worms and the structural materials business are for sale. Another business now sold is the infusions, dialysis and medical equipment unit.

At the same time, the planned takeover of Mobil Chemical's U.S. polystyrene activities is intended to expand BASF's international presence of this major product line. In addition, BASF intends to acquire parts of Olin Corporation's polyurethane systems business.

In spite of the fall in earnings BASF spent DM4.8 billion on tangible fixed assets in 1991, an increase of approximately DM350 million over the previous year. Similar capital expenditure is planned for 1992.

EUROPE-ASIA RELATIONS

Fujitsu To Produce Specific Circuits in UK

92BR0275 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 12 Mar 92 p 9

[Article by Didier Girault: "Fujitsu Will Produce Application-Specific Integrated Circuits in the UK"]

[Text] The Newton-Aycliffe plant is dedicated to the manufacture of DRAM memories and will produce application-specific circuits within less than three years.

Fujitsu's Newton-Aycliffe (UK) plant was built rapidly since the first brick was placed in September 1990 and has begun mass-producing 4-MB DRAM memories at an average weekly rate of 1,250 silicon wafers of 150-mm diameter. "With a very good yield," underlines Shiro Fujimoto, the plant manager. A faithful copy of the Japanese Iwate plant, the Newton-Aycliffe site should be able to produce at a rate of 3,000 wafers per week by 1993 and manufacture application-specific circuits in less than three years. Fujitsu is also planning to expand the surface of the class-1 clean room before 1995.

Two Manufacturing Methods

Representing an investment of £200 million so far, the Newton-Aycliffe site should comprise four production units once it is completed (£400 million have been budgeted). These units will concentrate on DRAMs (technological vector); on application-specific circuits for which Fujitsu has set up a program to conquer the European market; and probably on telecommunication circuits (GSM [Special Mobile Group], ISDN [Integrated Services Digital Network], local networks) which the Japanese company already disposes and experts in Manchester are in charge of "europeanizing" the products. The DRAMs, in fact, are not sold at a high price in Europe because of the low floor prices that bother European-based manufacturers. Moreover, "no ASIC manufacturer is making any money," asserts Shiro Fujimoto who insists, however, that he wishes to manufacture application-specific circuits in Durham as soon as possible.

In fact, diversification turns out to be necessary at the level of the entire group: "Fujitsu is thinking about it," states the plant manager evasively, refusing to specify the involvement of his company in telecom circuits, a direction that was, after all, announced two years ago.

Is it perhaps because the European market resists the Japanese pressure in this field?

The production of ASICs does not follow the same rules as that of DRAMs. The former requires the presence of many different processes while quantities are small, whereas the latter requires maximum production capacity. This is the reason for the planned installation of a clean room that is dedicated to the manufacture of ASICs and is part of all the class-1 clean rooms. Andrew Hunt, production manager at the Newton-Aycliffe plant, says: "Of course it will be a challenge, but it is possible to produce application-specific circuits and DRAM memories at the same time." Fujitsu also plans to expand the assembly and test capacities. At this time, Newton-Aycliffe uses 80 percent of the assembly and test capacities of the Fujitsu plant in Dublin. Between now and the end of the year, priority will be given to increasing manufacturing capacity and improving yields on the 4-MB DRAM memory circuits that are manufactured in 0.8-micron CMOS technology. Rather than manufacture new products, Fujitsu prefers to improve the characteristics of existing products. For instance, Shiro Fujimoto thinks that he will be able to arrive this year at the production of 4-MB DRAMs with access times of 70 nanoseconds. As to the 16-MB model, this is scheduled for next year.

Newton-Aycliffe is currently in a personnel expanding phase: There were 350 employees at the end of February 1992 (including 75 engineers, 75 technicians, and some 100 Fujitsu-trained operators). Personnel should amount to some 450 employees by 1993. In the opinion of Llew Aviss, personnel manager of Fujitsu Newton-Aycliffe, recruiting is facilitated by the size of the university net covering the area. "Before Fujitsu had its own production line, it trained its operators on the pilot production line of the University of Durham." The region has traditionally welcomed the Japanese. In 1856, the first Japanese mission in search of industrial know-how arrived in the county of Durham. At this time, 48 Japanese companies are established there, including the automobile manufacturer Nissan.

Alcatel Espace To Build Parts for Japan's Adeos

92WS0471D Paris AFP SCIENCES in French 26 Mar 92 p 12

[Unattributed article: "Alcatel Espace to Participate in the Construction of the Japanese Adeos Satellite"]

[Text] Toulouse—On 24 March, the French company Alcatel Espace announced that it would participate in the construction of the Japanese observation satellite Adeos, which is scheduled to be launched in 1995 on the Japanese rocket H2.

Mitsubishi Electric, the company in charge of systems integration for the 35-ton satellite, has awarded to Alcatel Espace a contract for the construction of X-band transmission equipment, a communique published in Toulouse indicated. This equipment, Alcatel Espace pointed out, will be manufactured at the company's industrial center in Toulouse.

Alcatel Espace belongs to the RSD (Radio Space and Defense) group, which brings together the expertise and activities of 22 subsidiaries or divisions operating in the

fields of radio-relay links, earth stations, mobile communication systems, satellite payloads, defense communication systems, and security and navigation systems. Sales of the RSD group amount to about 10 billion francs.

Korean Firms Target European Markets

Auto Maker

92WS0483A Paris L'USINE NOUVELLE in French No 2359, 9 Apr 92 p 41

[Article by Alain-Gabriel Verdevoye: "Korean Automobiles Besiege the West"; first paragraph is L'USINE NOUVELLE introduction]

[Text] In Western Europe, the markets targeted include those of Great Britain, Germany and France; in Eastern Europe, the target is Poland. Now all Korea needs to do is improve quality.

Chung Ju-Yung, the founder of the South Korean group Hyundai, and nothing less than a national symbol, will soon be selling his shares in the company to devote himself to politics. The decision of the father of the Korean automobile miracle to bow out at the age of 76 ends an era that saw an automobile industry spring from nothing to maturity. Korea produced 1.5 million cars last year, more than Great Britain. Now that the pioneer days are over, it is time to consolidate and seek the ultimate benediction: penetration of the European market.

True, Korea's debut is still timid: The country distributed a mere 73,000 vehicles in the Old World in 1991. But the figure represents a jump of 150 percent in one year! And the Koreans are avid: Hyundai alone plans to sell 90,000 cars in Europe this year. It is not an unrealistic forecast in light of the offensive in the East, especially Poland, where Hyundai (15 percent owned by Japan's Mitsubishi) hopes to sell 12,000 cars. The priority targets in the West are Great Britain and Germany, and also France, where Hyundai is expected to market its cars in the Fall. Its goal is to sell 8,000 to 10,000 vehicles in France by mid-decade. Kia, the number-two Korean automaker, is no laggard either. The company has ties with Ford and Mazda—which between them own 18 percent of its capital—and began exporting minicars to Great Britain in 1991. But Kia plans to expand in France and in the former communist countries. Daewoo, which primarily makes spinoffs of Opel models, and Ssangyong, the all-terrain vehicle specialist, also have plans.

European and Japanese automakers ultimately fear the rise of the Koreans, who managed to export 375,000 vehicles last year. But before the auto industry of the Land of the Calm Morning can become a serious competitor in the markets of developed nations, it must overcome three major handicaps: lagging technology, mediocre productivity, and a shabby reputation for quality. All that against a backdrop of labor disputes. The recent strike in Hyundai's factories in December and January reportedly cost 5 billion French francs [Fr]. Like the Japanese in the sixties, the Koreans jumped to the conclusion that they could sell anything abroad, especially in North America. And after a strong start, they fell flat on their faces in 1989 and 1990. But like Honda, Nissan, or Toyota before them, they learned their lesson.

Today they are tackling Europe with products that are much more esthetically and technically advanced, and more reliable. And they are backing their assault with colossal investments—up 25 percent this year—that total nearly Fr15 billion.

Four Small Koreans

Production of the manufacturers in 1990 (in number of vehicles)	
Hyundai	557,000
Kia	225,000
Daewoo	185,000
Ssangyong	18,500

Electronics Firms

92WS0483A Paris L'USINE NOUVELLE in French No 2359, 9 Apr 92 p 42

[Article by Jean-Pierre Jolivet: "The Korean Wave Washes Over European Electronics"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Manufacturers from the Land of the Calm Morning are making more sophisticated products and beefing up their marketing resources.

Korean manufacturers of consumer electronics are ogling Europe—especially France. And some of their motives are ulterior. As they multiply their investments and manufacturing installations here, they are still hopeful of turning up partnership opportunities, especially now that local manufacturers—Philips, Thomson Consumer Electronics, Nokia, or Grundig—are wondering about their future.

The Korean wave is washing over the continent. Goldstar is opening a refrigerator plant in Italy. By late 1992, Daewoo will make big-screen television sets, measuring 55 to 70 cm, in its new Fameck site near Metz. Daewoo also plans to open a plant to produce television tubes with European partners, at a total cost of nearly 1 billion French francs [Fr], in the Longwy region. Haitai has decided to step up production of car radios in Lexy, in the Lorraine region, and will spend Fr13 million to do so this year, on top of the Fr30 million it has invested since 1989. The Korean wave is all the more disquieting as it is attacking the European bastions of middle- and top-of-the-line equipment.

The era of price-slashed bottom-of-the-line "made in Korea" items is over. "With retail prices that drop 10 percent a year, exploiting that niche is out of the question," explains Bernard Labaume, the general director of

France Goldstar. The Koreans must deal with the rise of the Dragons everywhere in Europe.

Revamping Their Strategies

In France, imports from Hong Kong jumped 49 percent in 1991, while Malaysian imports rose 19 percent and Taiwanese 18 percent. All were essentially bottom-of-the-line products. Staying competitive in that niche is tough with salary costs that are exploding in Korea!

To save the situation, the Koreans have had to revise their strategy by positioning themselves in the market for more sophisticated equipment. This has often required taking a fresh, hard look at their whole system. After a meticulous worldwide tour of distributors, Samsung's vice-president In Ku Kang decided in 1989 to institute a sweeping program to promote total quality, which has since become an obsession for the group.

Today, Samsung has gradually abandoned offshore equipment manufacturing (equipment made for other manufacturers) to concentrate on its own products. It has focused in particular on imaging devices, for which the company has acquired a solid reputation in just a few years. Samsung is the second producer worldwide of tape recorders, the fourth-largest producer of television sets, and the fifth-ranking manufacturer of compact disk readers. The company has based its penetration on constantly expanding its catalog to include more sophisticated products. "We are beginning to market 70- and 82-cm stereo television sets on the French market. Next, we will launch a laser video disk that we developed with Philips," says Christian Paillot, the CEO of Samsung Electronics France, which is 49 percent owned by the Korean firm. The same concern is motivating Haitai—the top Korean manufacturer of CD players and a specialist in car radios—to enter the stereo system market.

Taking advantage of their strong positions in household appliances (microwave ovens), Goldstar and Daewoo are tackling the market on all fronts. That strategy has prompted them to beef up their marketing resources, distribution networks, and manufacturing plants in Europe.

Developing Their Own Technologies

But the Korean electronics industry's systematic offensive has forced it to develop its own technologies. "Especially since Japanese licenses, which are the Koreans' main source, are becoming harder to get," observes an electronics manufacturer. In 1992, Samsung and Goldstar each plan to invest nearly Fr2 billion in research and development of new products. That is a 30 percent increase in spending. "All in all, it is a lot of money for an industry that has barely reached maturity. But it is a drop in the bucket compared to the cost of innovation," reply the specialists.

The Koreans are aware of the risk. That is another reason they are digging in in Europe. Indeed, Europe could offer them partnership opportunities, with the "deal" consisting of swapping European technologies for low-cost manufacturing know-how. The idea has continued to make inroads since Alain Gomez, Thomson's CEO, visited Seoul last fall.

World-Size Groups

Korea's Main Consumer Electronics Manufacturers in 1991

	International rank	World sales (billions of French francs)	Staff	Major products	European plants
Goldstar	7	29	35,000	Television sets, tape recorders, stereos, microwave ovens, car radios	Germany, Turkey, Great Britain, Italy
Samsung	9	22.5	21,700	Television sets, tape recorders, compact disk readers, microwave ovens	Spain, Portugal, Great Britain
Daewoo	12	15	13,000	Television sets, tape recorders, stereos, integrated compact-disk readers, microwave ovens	France (Longwy and in late 1992 near Metz), Ireland
Haitai	-	2.4	3,000	Compact disk players, stereo systems, car radios	France (Lexy)

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